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Educational specifications for the construction of campus facilities for occupational education in Pima County, Arizona are established. The study design used by the consulting firm and the governing board was--(1) establishment of a philosophical base for Pima Junior College, (2) recommending educational specifications by reviewing present educational offerings, analyzing the state study of "Community College Possibilities," comparing Pima County to other similar districts, examining other junior college offerings, and discussing the findings with the junior college board, (3) developing the educational specifications at three enrollment levels, and (4) publishing a brief find report including recommendations. Activity and academic program relationships diagrams, course descriptions, administrative framework, methodology for facility inventory, and a facility requirement projection are included. Tabulation of the results of the space requirements and educational specifications for the three enrollment projections is given in detail. (HH)

PROGRAM GUIDELINES AND SPACE REQUIREMENTS FOR PIMA COUNTY COMMUNITY COLLEGE

ED023257
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Arthur D. Little, Inc.

SPACE REQUIREMENTS
FOR PIMA COUNTY
COMMUNITY COLLEGE

Report to

The Governing Board

C-69337

August 1967

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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Arthur D. Little, Inc.

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THE STUDY TEAM

The ADL study team responsible for the report includes the following persons:

Dr. Robert Barringer
Dr. Claude Gruen
Dr. Frederick Kintzer, consultant to ADL
Mr. Roger Malek
Mr. William Ollinger
Dr. Raymond Young, consultant to ADL
Dr. George L. Hall, Case Leader

ACKNOWLEDGMENTS

We acknowledge with thanks the splendid cooperation of the following people who assisted in many ways. Without their thoughtful and willing help the investigation and findings would have been much more difficult. In addition to these people who were so helpful, we acknowledge with thanks those who participated in the discussion sessions as shown in Appendix A.

Mr. John Butler
Mr. Paul Butler
Mr. G. E. "Doc" Hamilton
Mr. Miles Hubka
Dr. Thomas Lee
Mrs. Dorothy Martin
Mr. Joseph Metcalf
Mr. Carlos H. Moore
Mr. Philip Richardson
Mr. Richard Snider

Listed below are the members of the Governing Board of Pima County Community College who have shown continuing faith in the community college and dedication to the establishment of a college for Pima County.

Mr. Jacob Fruchthendler, President
Mr. Thomas Navin, Vice President
Mr. S. Lenwood Schorr
Mr. Martin Ginsburg
Mrs. Maria Urquides

I. INTRODUCTION AND SUMMARY

The Arizona State Board for Junior Colleges in cooperation with the Pima County Junior College Planning and Development Committee recommended the establishment of a public community junior college after a very thorough examination of educational needs. At an election held on November 8, 1966, the Pima Junior College District was formed, and five persons were appointed to the Junior College Board. Site studies were completed, and one site of approximately five hundred acres was recommended to the Arizona State Junior College Board for initial development. The State Board approved 260 acres which is being obtained from the federal government. Two additional sites have been recommended for future college expansion needs. On October 3, 1967, at a special election, the voters of Pima County will be asked to authorize a sale of bonds for an amount to be later determined and to elect the regular junior college governing board.

The present Board engaged the firm of Arthur D. Little, Inc., to develop the educational specifications for campus facilities and they also selected the associated architects Friedman Jobusch Wilde and Caudill Rowlett Scott to design and supervise the campus construction.

The proposed Pima County Community College, which expects to enroll the first students in the fall semester, 1969, will operate under Arizona statutes which assign broad comprehensive purposes to the state supported two-year colleges.

A. THE SCOPE OF THE STUDY

To establish the educational specifications for the construction of the campus facilities, the Arthur D. Little Company and the Governing Board of the College District agreed to the following study design:

1. Through discussion with the Pima Junior College Board, establish the philosophical base for the comprehensive public junior college. Make recommendations concerning the establishment of the three enrollment levels for the educational specifications. Make recommendations regarding the physical space requirements following an investigation of a variety of modern techniques and their space requirements.

2. Establish guidelines for the development of the educational program.

    a. Review the existing educational offerings and vocational-technical training presently available to the Tucson area.

   b. Analyze the State's study of "Community College Possibilities"[1] for curricular implications.

   c. Compare Pima County to other geographical areas to relate junior college educational experience to the new district.

   d. Analyze curricular offerings and the student distribution pattern at Phoenix Junior College for possible suggestions for the proposed college.

   e. Discuss findings and recommendations with the Pima Junior College Board's volunteer Educational Planning Committee.

   f. Consult with the Junior College Board and establish the educational guidelines for the development of the comprehensive community college.

3. Develop educational specifications at three enrollment levels.

4. Publish a brief final report including recommendations for the educational specifications for the construction of the junior college facilities.

B. EDUCATIONAL SPECIFICATIONS OF COLLEGE FACILITY REQUIREMENTS

The ultimate objective of the research and study was to establish the educational specifications. On the basis of the findings and conclusions generated by the above areas of inquiry and analysis, guidelines were established for the preparation of detailed college facility needs for the first phase of development and for the recommended ultimate levels on the central campus. In addition to specifications for the numbers and types of rooms required by the first phase and for ultimate development, the study includes recommendations for staging diagrams of desirable spatial and functional relationships. The specifications were developed by modifying a series of alternatives through the use of a computer program. This program defines facility requirements for different curricular distribution patterns and represents the experience of over seventy junior colleges throughout the country.

Utilizing the planning program, as modified by the experience and judgment of knowledgeable persons in the field and by local needs, Arthur D. Little, Inc., prepared detailed specifications of all facility requirements for the first phase of development. The specifications include the number, area, and types of spaces required for non-instructional programs and for administration and service areas. Any assumptions and standards used in the development of the specifications are clearly defined to facilitate their modification.

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[1] Conducted by the Arizona State Board for Junior Colleges and the Pima County Junior College Planning and Development Committee, June, 1966.

Enrollment levels were designated at 2,800 full time equivalent students and at 3,500 and 6,000 full time equivalent students for the estimated ultimate development. We prepared detailed specifications of spaces required for instruction and other functions of the college. The college architects are expected to derive a construction phasing program based on the most efficient aggregation of individual spaces in terms of realistic physical planning and construction modules and cost limitations.

In the process of formulating a campus plan, it is important that the educator communicate to the architects and campus planners the desirability of space relationships which will optimize the influence of space on the educational program. For this reason we examined desirable spatial and functional relationships suggested by the educational program, anticipated enrollment levels, and the resultant facility specifications. For the ultimate development levels we diagrammed the general relationships between major functional blocks of space to aid the architect in space planning.

C. STUDY PROCEDURE

At the request of the Governing Board of the Pima County Community College, "A Study of Community College Possibilities in Pima County, Arizona"[1] was used as the foundation for our educational planning. The enrollment forecasts reported in the study were accepted, and the findings and conclusions concerning curriculum planning formed a springboard for more refined and definitive investigation of occupational education needs as they relate to future programs at Pima County Community College.

Additional studies and reports which proved useful in the determination of occupational educational guidelines were as follows: "Manpower Directions, 1975," Arizona State Employment Service, 1967; "Manpower Trends in Health Services Occupations, Maricopa County," Arizona State Employment Service; "Manpower Trends in Selected Para Medical Occupations," Arizona State Employment Service; "Semi Professional and Technical Curriculums: A One Year Follow Up Study of the Entering Freshmen, Maricopa County Junior College District;" "Annual Descriptive Report of the Bureau of Agricultural Education," State of California; "Career Training in Hotel and Restaurant Operations at City College of San Francisco;" and "A Survey of Technical Needs of Industry and the Implications for Curriculum Development in Higher Education, 1966" Northern Illinois University.

"A Study of Community College Possibilities in Pima County, Arizona" concluded that the priority occupational educational fields were business, health, electrical and electronics, law enforcement, air conditioning and refrigeration, automotive, hotel, motel and food services, and electronic data processing. Other fields were identified, but the above appear to be those which are most in demand. Accordingly, representatives from the following fields were invited to discussion meetings concerning their respective areas of concern:

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[1] Conducted by the Arizona State Board for Junior Colleges and the Pima County Junior College Planning and Development Committee, June, 1966.

Health Services
Electrical and Electronics Technology
Automotive Technology
Law Enforcement, Fire Prevention and Security Technologies
Government and Business Services
Hotel, Motel and Food Services
Air Conditioning and Refrigeration
Aviation
Agriculture
Optics

In addition to the above group discussions, interviews were conducted with the following persons to further refine occupational training needs:

Dr. Robert Hanley, President, Maricopa County Community College
Dr. Marvin Knudson, Executive Director, Arizona State Junior College Board
Sisters of St. Elizabeth of Hungary, Out-patient Clinic
Dr. Thomas Lee, Assistant Superintendent of Schools, Tucson
Mr. Philip Richardson, Manager, Television Station KTKT
Mr. G. E. "Doc" Hamilton, Manager, Television Station KBOA
Mr. Joseph Metcalf, Manager, Sears Roebuck, Tucson
Mr. Carlos H. Moore, Arizona State Supervisor, Agricultural Education
Mr. Robert Shelton, General Manager, Old Tucson

Numerous discussions were held with the Board of Governors, Pima County Junior College, and with individual members of the Board. Formal discussions were concerned with such matters as enrollment forecasts, educational specifications, and philosophy of Pima County Community College. Informal matters included selection of a president, the role of the Board, administrative functions, and educational advisory committees. Individual conferences were conducted with selected community college presidents, and one group session was attended by all Arizona community college presidents.

Dr. Raymond Young, Professor of Higher Education, The University of Michigan, who had served as Chairman of the Study of Community College Possibilities, Pima County, Arizona, was engaged by ADL as a consultant to assist in translating the study and program guidelines.

In all, seven persons made up the ADL study team, while many other professional staff of ADL reviewed materials pertaining to the Pima County Community College study and participated in discussions, findings and recommendations.

The major part of the contract with the Pima County Community College Governing Board was for educational specifications for the college campus. The study and interaction referred to above formed the basis for the detailed educational specifications. The findings and conclusions from the above activity formed the basis of four sessions which were conducted with the associated architects Friedman Jobusch Wilde and Caudill Rowlett Scott concerning the building program.

II. THE PHILOSOPHICAL BASIS OF PIMA COUNTY COMMUNITY COLLEGE

The philosophical basis of the college underlies its educational organization Purposes, objectives and goals must be clearly stated before the college can take form and substance.

In a free society, committed to the concept of realization of the potentialities of every man and woman, we must provide a variety of educational opportunities. We know men differ in their natural abilities. So what greater inequity in education than to force all individuals into a situation where those of unequal ability are offered "equal" educational opportunity? It is an essential task of the public community college to provide the variety of education needed in order that every individual, regardless of ability, may have an opportunity to prepare for responsible work.

The Citizen's Committee for the Community College was instrumental in conducting the feasibility study and worked with ADL consultants on the statement of philosophy, which was adopted unanimously by the governing board.

The statement of philosophy follows:

STATEMENT OF PHILOSOPHY AND PURPOSE*

The Pima County Community College provides an open door to educational opportunity. It is more interested in what a student is ready to do than in what he has done. Seriousness of purpose and the ability to profit from selected instruction are the characteristics most sought among those who enroll. The college expects each student to demonstrate satisfactory performance and to achieve his maximum potential.

Arizona law defines a junior college as an "educational institution which provides a program not exceeding two years training in the arts, sciences and humanities beyond the twelfth grade of the public or private high school curriculum or vocational education, including terminal courses of a technical and vocational nature and courses beyond the basic education courses for adults."

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* Adopted by the Pima County Junior College District Board, May 17, 1967, upon recommendation of the Citizens' Committee for the Community College.

The Pima County Community College operates within this definition and declares its functions to include:

1. General education to prepare students for intelligent living.
2. Occupational education programs of varying length to prepare students for useful and satisfying vocations not requiring a baccalaureate degree, with particular emphasis on community needs.
3. Two years lower division collegiate work to enable students to progress smoothly into upper division work at the universities.
4. Continuing education courses to satisfy the vocational and avocational aspirations of those young people and adults who usually attend evening classes.
5. Guidance and personal counseling services to assist students in making sound decisions concerning their academic work and future careers.
6. Community services related to identified needs including cultural, recreational and general interest programs.

* * *

Implications of the above philosophical statement are many. The Pima County Community College is to maintain an open-door admission policy which welcomes all high school graduates and those without high school diplomas who are mature and seek to improve themselves.

Such an open-door policy demands excellent counseling and guidance. To provide adequate student direction, one professionally trained counselor should be available for every 450 students. Faculty members who enjoy working with students should supplement the student services by acting as educational program advisors.

The comprehensive public community college serves a heterogeneous student body of young and old. Verbal intelligence and academic preparation vary tremendously. The students seek both vocational and pre-professional objectives, some via short, intensive courses and others through two-year programs. This heterogeneity demands that the college provide a variety of teaching techniques, from the classical lecture discussion to such recent innovative techniques as self-teaching methods through programmed learning, audio-tutorial laboratories, closed and broadcast television, and computer assisted instruction. Classes should be sized to accommodate the variety of instructional methods. There should be large demonstration classrooms as well as medium to small rooms for seminars and carrels for individual study.

A. JUNIOR COLLEGE DEGREES AND CERTIFICATES

Junior or community colleges confer associate degrees and certificates. The usual associate degrees are A. A., associate in arts, and A. S., associate in science. The certificates vary according to program but are usually awarded upon the satisfactory completion of a definite educational program, ordinarily of less than two years in length. This program of junior college certificates permits recognition of all legitimate educational offerings, especially those unique programs in occupational education.

III. THE ROLE OF THE COMMUNITY COLLEGE

A. OCCUPATIONAL EDUCATION EMPHASIS

The role of the comprehensive community college is usually defined as serving five or six functions, depending upon how the tasks are stated. The functions are general education, occupational education, college transfer, continuing education, guidance and counseling, and community service.

The function of preparing students for occupations and careers in business, industry, and the professions is the area wherein community colleges differ as each junior college attempts to serve the unique needs of its service area.

This investigation and report are more concerned with the occupational education needs than with the traditional purpose of liberal arts, as it is in this area that the community college will differ from sister educational organizations.

Occupational education is considered so important to our national economy and growth that recently a blue ribbon committee was convened to discuss and state the importance of the community college function. The National Advisory Committee on the Junior College, composed of national leaders in business, industry, labor, higher education and government stated:[1]

> "The two-year college offers unparalleled promise for expanding educational opportunity through the provision of comprehensive programs embracing job training as well as traditional liberal arts and general education. Occupational education efforts already initiated in junior colleges should be reinforced, and new resources and programs should be developed where necessary.
>
> If we want our citizens to have and accept the responsibilities and privileges of a free society, we must provide them with appropriate education and training. This is an obligation not only of educational organizations, but of all American institutions. All of us must share in a planned program for the expansion of opportunity for education beyond high school. This committee, with the American Association of Junior Colleges, stands ready to cooperate with other agencies and institutions, with business, industry, labor and government in this critical and urgent enterprise."

---

[1] "A National Resource for Occupational Education," AAJC, 1775 Massachusetts Avenue, N.W., Washington D. C. 20036, December, 1964. See Appendix C for the listing of members on the National Advisory Committee.

Today there are a multitude of occupations for which at least two years of college study are necessary. These are often referred to as middle-manpower jobs, the semi-professional and technical positions which comprise a major category of employment in business, industry and the professions. These jobs are an outgrowth of the technological revolution in which automation and mechanization have replaced the unskilled and sometimes even the skilled worker in factories, offices, hospitals, laboratories, and on farms.

It is ironic that with today's wide-spread unemployment there is a growing shortage of people to fill the new, more sophisticated jobs in American business and industry. The need for semi-professional and technical manpower has been well documented. The National Science Foundation reported in 1964 that by 1970 all industry would require more than 1,300,000 technicians. This figure, contrasted with 775,000 employed in 1960, gives some suggestion of the education and training job that lies ahead. Trained personnel are needed in such areas as engineering, nursing, medical-dental and X-ray technology, business data processing, accounting and office management, agriculture technology, law enforcement, home economics and specialized secretarial work.

B. ARIZONA'S MANPOWER DEMAND

"Manpower Directions, 1975,"[1] states:

> "By 1975, for the state as a whole, in all occupational categories, Arizona can expect to lack trained manpower for slightly more than one out of three job openings requiring occupationally prepared workers, based on the present rates of training output and in-migration. . .Numerically, the population and labor force of Arizona by 1975, 2.3 million and 777,000 respectively, will be more than adequate to support 750,000 anticipated employment level estimated for that year. To reach this level of employment will require 310,000 more trained workers.
>
> The state's occupational profile will continue its long run trend of shifting to the more highly skilled, technical and sophisticated occupations which require varying degrees of preparation in high school vocational programs or in post high school programs, trade schools, junior colleges, universities and/or formal on-job training.

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[1] "Manpower Directions, 1975," A Statistical Summary and Preliminary Analysis of Arizona's Manpower Resources and Needs Through 1975. Arizona State Employment Service, March, 1967.

By 1975, Arizona will require 116,500 more trained workers than existing training output and in-migration will be able to provide. This state could be short of meeting its trained manpower requirements by: over 40% in professional, technical and managerial personnel; over 35% in clerical workers; less than 10% in sales personnel; over 40% in the service occupations; more than 60% in skilled craftsmen; and about 20% in semi-skilled occupations. At the same time, Arizona will probably have a 20% surplus of workers possessing relatively low level agricultural skills.

Considering all of these factors, it is readily apparent that the crux of Arizona's manpower shortages is not a quantitative problem, but rather is a qualitative problem involving top skill composition and degree of occupational preparedness of the labor force and the ability of Arizona's training resources, public and private educational facilities at all levels, and industry trained resources to supply the trained manpower which will be required.

C. PIMA COUNTY

The report, "A Study of Community College Possibilities in Pima County, Arizona,"[1] revealed strong local potential support for the college and the need for occupational education. "Nearly nine of every ten parents felt that everyone with ability to profit from college, regardless of financial means, should go to college." About one third of the parents in Pima County anticipate that their children will complete a two year junior college and about one half of that number are interested in having their children prepare for a skilled trade.

The Pima County parents who responded to the questionnaire in the study of community college possibilities indicated that they personally would take advantage of the continuing education services of the college. Nearly one third of all fathers and mothers expressed interest in courses for job improvement while a small number would seek courses for self enlightenment.

In Pima County it is estimated that between 55% and 60% of high school graduates continue their education beyond high school. This estimate is based upon transcripts sent to colleges, universities or other post high school organizations. The community college feasibility study reported: "A fourth of the high school graduates indicated that if two years of college or semi-professional vocational training had been available in the region when they graduated from high school, they definitely would have taken advantage of it, while 22% and 18% of men and women respectively 'might' have." 2

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[1] Published by The Arizona State Board for Junior Colleges and The Pima County Junior College Planning and Development Committee, June, 1966.

2 Ibid., p. 205

High school seniors also expressed interest in the proposed local college. Twenty-four per cent of the high school seniors were interested in a two year community college, while sixteen per cent of the total students preferred liberal arts programs. The vocational preferences were for business, para medical, electronics, automotive, art and design.

In general, analysis of the study of high school seniors, recent high school graduates and parents of fifth grade students suggests curricular patterns in keeping with experience of established public community colleges. There is need for the comprehensive programs outlined in the philosophical statement, for general education, vocational-technical education, and lower division liberal arts.

It is impossible to predict what part of the future student body will be enrolled in these respective courses. Experience of other community colleges is one indicator, however, and it is felt that if communities similar to Pima County could be identified, some helpful comparisons could be made.

In addition to the analog method, which description follows, we conducted a study of Pima County students enrolled in other Arizona junior colleges. The findings of the Arizona junior college study are reported on pages 34-37.

1. The Analog Method

In order to make some initial hypotheses about the type of educational programs that might be needed by the economy of Pima County, Arizona, we undertook a comparative analysis to identify those California counties with similar employment characteristics. We then selected junior colleges from these counties and examined their educational programs as a first step in constructing a model curriculum for Pima College. This method assumes that existing junior colleges, especially the older ones, are responding to the needs of local business and industry and that this is reflected in their present curricula.

We first examined the pattern of employment for Pima County and compared it with the patterns of employment for 56 California counties. The categories of employment were aggregated into 32 sectors by the United States Department of Commerce in their decennial publication of employment statistics.[1]

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[1] "Growth Patterns in Employment by County," 1940-1950 and 1950-1960, U. S. Department of Commerce, Office of Business Economics, Volumes 6 and 8 .

A computer file which listed the percentage of the county's residents employed in each of the 32 sectors was compiled for Pima and all California counties. The mean squared difference between the percentages was calculated for each sector and for each county. We then identified those California counties which varied least from the pattern of employment in Pima County, and these counties were used as a measure of comparable industrial mix. In our analysis we were only incidentally concerned with a comparison of the size of employment between counties. However, where differences in total employment by sector between counties were large, we discounted the fact that they had comparable percentages.

As a result of this analysis, four California counties were found to be comparable in the percentage of distribution among the 32 employment sectors. These counties were as indicated in Table 1 below. All other counties ranged from 3.88 to 47.43 for mean difference squared.

TABLE 1

COMPARISON OF EMPLOYMENT PATTERNS, PIMA COUNTY AND FOUR CALIFORNIA COUNTIES

County	Mean Difference Squared	Total Employment
Pima		91,879
Santa Barbara	1.67	67,021
Marin	1.98	56,807
Alameda	2.30	355,376
San Bernardino	2.64	177,481

Nine colleges located in these four counties were identified, and their curriculum patterns were compared with each other and with the results of the local business and industry interviews, the percentage of Pima County students taking courses in other junior colleges, the occupational offerings in Arizona junior colleges, the mean curriculum distribution pattern for all California junior colleges, and the mean curriculum distribution pattern for California junior colleges for those areas identified in the local surveys.

As a result of this analysis, the curriculum distribution patterns of Chaffey College and San Bernardino Valley Junior College were selected as the starting point for constructing the model curriculum for Pima College.

IV. OCCUPATIONAL EDUCATIONAL PROGRAM GUIDELINES

"A Study of Community College Possibilities in Pima County, Arizona" included a study of needed manpower skills. The greatest needs reported by the Citizens' Committee on Business, Industry and Government were for trained workers in the following fields: business; health; electric and electronic technology; law enforcement; air conditioning and refrigeration; automotive and diesel; and hotel, motel, and food services. To refine and extend the information in this study and to translate the needs into exact educational programs, a series of conferences was conducted with representatives from the identified need areas and from selected occupational fields of agriculture, aviation, and optics.

The discussions with the representatives from selected vocational fields assisted in the selection of appropriate occupational areas for the new college. The exchange of ideas and information was pertinent to the refinement of educational need and employment possibilities. The group discussions are summarized below. No attempt is made to report the discussions verbatim. It is the intention to convey the gist of the meetings and, where considered important for follow-up, to delineate the actual statements.

It is the responsibility of this study to establish the educational guidelines. The definitive curricula work must be accomplished by the college administration and faculty. To assist the faculty in this regard, an attempt should be made to enlist certain of these representatives as members of advisory panels. After the educational program is established, the college administration should continue to work with the citizen groups.

The extensive use of lay advisory committees drawn from professions, business, and industry will help establish and keep open the communication channels between the college and the occupational areas. Good communication will alert the college to changing professional, business, and industrial needs.

A listing of representatives who attended the meetings to determine the college occupational education programs is found in Appendix A.

A. GROUP DISCUSSION CONCERNING CAREER COURSES IN HEALTH SERVICES

The "Study of Community College Possibilities in Pima County, Arizona" stresses the need for educational programs in para medical occupations. "Manpower Trends in Selected Para Medical Occupations," published by the Arizona State Employment Service, June, 1965, supports this view by forecasting statewide shortages in 1970 as follows: 1,170 registered nurses; 280 licensed practical nurses; 60 medical technologists; 50 laboratory technicians and assistants; and 50 X-ray technologists.

Tucson appears to be an excellent location for para medical educational programs designed to alleviate shortages. Tucson has excellent medical facilities, including the following:

1. Davis-Monthan Air Force Hospital: financed by federal funds--60 beds
2. Oshrin Hospital: financed by federal funds for Indian tuberculosis patients--99 beds
3. Palo Verde Hospital: psychiatric only--financed by fees--30 beds
4. Pima County Hospital: financed by taxes--160 beds
5. Saint Joseph's Hospital: financed by Catholic Church and fees--124 beds--30 bassinets
6. Saint Mary's Hospital: financed by the Catholic Church and fees--265 beds--23 bassinets
7. Tucson General Hospital: osteopathic--financed by fees--156 beds--12 bassinets
8. Tucson Medical Center: financed by fees--443 beds--100 bassinets
9. Veterans Administration Hospital: financed by federal funds--402 beds

With continued expansion of this basic industry, Tucson could move to the forefront in curative and preventive medicine.

Representatives from medical and dental professions indicated the following specific needs in the health fields:

1. Nursing

The nursing requirements in modern hospitals call for several categories of people other than RN's. Needed are ward (or unit) clerks who act as secretary to the head nurse and ward (or unit) managers, who relieve the head nurse of management duties. A ward or unit was defined as a grouping of one head nurse, three unit clerks, three unit managers, three staff nurses, six LPN's, thirteen aides and three orderlies, all of whom serve approximately 25 patients. "Position Paper on Education," available from the American Nurses Association, 10 Columbus Circle, New York, indicates that future nursing will call for the following three levels of training: professional nurses of the baccalaureate level; technical nurses from junior college level to provide bedside care; and aides of vocational level to assist nurses at both of the above levels.

A licensed practical nurse program is now offered through the adult evening school division of the Tucson public schools. This program has the cooperation of the local hospitals, where clinical experience is provided.

It was suggested by the discussants that a practical nurse program more properly belongs in the junior college, and the public school officials were also of this opinion. It is recommended that the LPN program be transferred to the college at a time convenient to the adult evening school and the Pima County Community College.

2. Technicians and Therapists

Approximately one half of the hospitalized patients in Tucson require inhalation therapy. Most technicians for this therapy are now trained on the job, but they could be better prepared at the junior college.

The new University School of Medicine will increase the number of specialized technicians required in Tucson. Although many technical programs demand a four year training program, some two year programs could be phased into four year programs later. A medical records trainee, for example, could apply his two year junior college background to medical librarian work. There is also the possibility of doing classroom work at the junior college and lab work at the University and hospitals.

The effects of medicare were discussed. More demand for occupational and physical therapy is envisioned. The growing social services require clerical help with special training. Thomas-Davis currently employs ten people who do nothing but fill out forms for the patients.

3. Psychiatric Care

Psychiatric care training aides in Tucson have for the most part been taught by in-service training. Specialized training for psychiatric care training aides usually requires more than a two year program, as does training for occupational therapy, which is presently served by a program at the University of Arizona.

Nursing homes need therapists and technicians at about the same rate as the hospitals and clinics.

4. Dental

It was reported that the Maricopa Community College would inaugurate a program for training dental hygienists, although no provision was made for training in the needed area of dental assistants and chair assistants. St. Elizabeth's Clinic and the County Hospital maintain dental clinics, which are available for clinical training purposes and could be used should the dental assistant programs be offered by the junior college.

Schools in the state are considering programs for dental lab technicians, and it was suggested that Pima County Community College provide core education after which the student could complete his training at the other school offering the dental lab program.

A part-time evening training program would be of value in the Tucson area for training dental assistants. The American Dental Society has developed an accredited program for the training of dental assistants and would probably encourage the Pima County Junior College to offer a program.

A follow-up interview was conducted with the head Sister of the St. Elizabeth of Hungary Clinic to explore the extent of cooperation possible between the clinic and the community college. It was learned that if the dentists working with St. Elizabeth of Hungary agreed to such a plan, the sisters would be most cooperative. Cooperation between the clinic and the community college would release the clinical laboratory for the chairside training of dental assistants, thus reducing the size and equipment of a practice dental facility at the college.

4a. Combined Medical-Dental Needs

The discussion reported above was preceded at a meeting on February 10, 1967, by an exploratory discussion engaged in by doctors, dentists, members of the Southern League for Nursing, and members of the Pima County Community College Board. A listing of discussants may be found in Appendix A.

The role of the junior college in health education was again discussed during the February meeting. The critical need for more registered nurses in the state of Arizona was the dominant theme. A 1965 survey showed that the nurse shortage was the most urgent concern in hospitals.

The junior college program, which would provide technical nurses in a two year period, would help in meeting this need. The technical nurse would be able to function as a beginning staff nurse.

The associate program should be carefully planned, and the State Board of Nursing should be consulted so that the work for the Associate degree will be considered suitable for an RN in Arizona.

There is the need for an excellent faculty, which will be difficult to supply because of the high ratio of teachers to students required in nursing education. This latter problem is the reason hospitals are phasing out their own schools of nursing.

In response to a question it was pointed out that there are two Associate degree programs in Arizona and two baccalaureate programs. The American Nursing Association recommends that all nursing education be undertaken in educational institutions.

There was a criticism concerning the lack of clinical experience provided by the hospitals in the Associate degree program, but it was pointed out that this same criticism is leveled at the baccalaureate program, and that the short time intern nurses spend in the hospitals is the primary reason for requiring such a high ratio of teachers to students; the carefully selected clinical experiences must provide efficient training.

Discussion concerning the teaching needs for others concerned with patient care revealed the need for LPN's, nurses aides, and male patient care attendants. The LPN's were cited as the workhorses of the hospital. They are considerably over-used, considering their one year of training. If they are to be used as they now are, they should have a two year program. (Some states already require an 18 month program.) New York has already recommended that by 1972 their LPN program be a two year program.

It was reported that the male patient care attendant also requires a training program. At the present time all training is on an in-service basis in the hospitals. However, the male patient care attendants are not properly trained to do all the things that they are expected to do, such as setting up traction, providing personal service to male patients, and practicing techniques.

All aide training is also on-the-job. Because of the heavy work load, proper supervision is not available, and training is inadequate.

All the above type of personnel are recruited from within the community, and all of these people could avail themselves of training programs the junior college would offer.

The point was reinforced that much of the training for technicians is provided as on-the-job training in the hospital, and the cost of such training is an important factor in the rising hospital costs. If workers came to the hospital already prepared, operating costs would be reduced.

Inhalation Therapy: Inhalation therapy is particularly important in Arizona, although there is a great shortage nationally. An estimated 50,000 inhalation therapists are needed nation wide. Only 20 schools offer this type of training--about one half of these are junior colleges and the rest are hospitals. Many patients needing therapy are unable to receive treatment because of the great shortage of therapists.

Medical Records Transcribing and Medical Records Technicians: At present it takes about three months of training on the job teaching terminology, etc., to prepare a good typist for transcribing, and even then she will not be adequate for the job. With the trend in the hospitals for more pooled dictation, the need for girls trained in transcribing is increasing. The technicians also require training in coding and statistics.

Many technicians need more training than a two year course can offer, but in certain areas, such courses could be useful.

Data Processing Programmers: Data processing programmers will be needed more and more in hospital work.

Supervisors: Admitting supervisors who have had courses in medical terminology, public relations, insurance, accounting, and credit could be trained in a two year program and would fill a great need. (This suggests a middle management program.)

Physical Therapy: Physical therapy aides and correctionists are needed and could be trained in a two year program.

Courses in medical terminology would be desirable in programs designed for less than two years' training.

Dental Auxiliary Personnel: The auxiliary personnel needed in a dental office include hygienists, technicians, and chairside assistants-receptionists. The hygienist program is said to be an ambitious program which is and should be handled in the dental school. The technician who handles mechanical fabrications is presently trained in an on-the-job apprentice program. Dr. Thomas E. Bradel felt there are qualified people available in Tucson to offer this type of program in a junior college.

The chairside assistants-receptionists are almost always girls and usually trained on-the-job. The busy dentist is often frustrated because he must give time to training the girls; it would be most helpful if the girls already had background, practical training, and instruction in dental terminology.

The doctor usually requires a medical secretary who has some medical knowledge, typing ability, and the ability to meet people. He needs an office nurse and sometimes a laboratory technician. While physicians would like to have better qualified people, the needs in the doctor's office are met without much difficulty.

Nursing homes are private businesses, and the operators do not broadcast their difficulties. However, the number of homes being licensed for medicare is bound to create a shortage of help, and many homes throughout the country are staffed by inadequately trained personnel.

There are now no occupational therapists or aides working with nursing homes in Tucson, although local nursing homes need therapy aides. The homes also need aides in the areas of physio-therapy, medical records, medical secretaries, and possibly in computer operation.

One hospital in Tucson has a personnel turnover of 45% in one year. Positions should be upgraded by increased salaries and by an increase of status. To this end, it was felt that certificate programs were of the utmost importance.

The point was made that although most of the manpower needs in mental health are now being met without the benefit of any special kind of vocational education, the projected manpower needs for the next five years indicate that not even the state universities will be able to meet the needs for professionals. The Associate degree program is going to be a primary resource for meeting personnel needs. At the present time people with only a B. A. or two year college level training are the principal contact with mental health patients. In many clinical situations aides do the patient contact work. The ability to establish a relationship, however, and the desire to be of service are often of more value than a large amount of scholarly education. Therefore, the junior college may continue to send staff into this area.

In concluding the meeting, the group felt that the community college should avail itself of the total range of community resources and use the hospitals and clinics for providing clinical experience for its students.

Of the several medical-dental programs discussed at both sessions, the following appear to have relevancy for the Pima County Community College:

Registered Nurse
Practical Nurse
Inhalation Technologist
Medical Technologist
Ward Medical Records Clerk
Dental Chairside Assistant
Dental Assistant
Medical Assistant

B. ELECTRICAL AND ELECTRONIC TECHNOLOGY

The discussion focused on electrical and electronics vocations as outstanding career opportunities. A basic communication deficiency in the middle level technician area could be remedied by the junior college. Courses should strengthen the technician's ability to communicate and stress basic fundamentals as well as applications. It was noted that OHM's Law is not really understood by many broadcast engineers who apply its principles.

Electrical repairmen and maintenance personnel are now trained through in-service programs. It would be desirable to introduce the workers to mathematics and science principles before job entry. A new field has emerged in circuit layout drafting, which does not follow typical, normal drafting procedures. This occupation should be explored.

It was reported that no major changes had occurred in the principles of heavy equipment repair. Technical training for this activity is no longer offered in most community colleges as personnel are presently coming directly from the high schools and the armed forces. Nearly all middle management personnel are now in-service trained.

The communications industries require many more trained engineers. Technicians could release engineers for top level work. According to the FCC regulations, broadcast engineers must have third class licenses, and each broadcast station must post at least one first class license. Neither the University of Arizona nor Arizona State University at Tempe teach the electronics of broadcasting, hence the licensed personnel are very scarce. Examinations for these licenses are given by the FCC, but most training is through mail courses which prepare the student for the test without teaching him the fundamentals. Ideally, the technicians and engineers should know how to maintain and repair communications equipment as well as how to operate it.

In the data processing occupation there is not a large current demand for programmers, although key punch operators and operators of other types of small computers are needed. The Tucson Public Schools offer EDP courses which indicate another area for careful articulation. A Management Information Systems course offered by the college could be valuable. The Tucson Gas and Electric Company reportedly needs key punch operators and data processing machine operators. Their employees are taking courses for job upgrading at the University of Arizona, Arizona Institute of Technology, and other schools. They especially need courses to increase their communication skills if they are to advance into supervisory positions.

It was emphasized that if the college desires to offer instruction in TV, the same equipment which is used for actual broadcasting need not be used. For training purposes a full studio is not needed, and the possibility of obtaining some equipment with a built-in malfunction for repair training purposes was discussed.

C. AUTOMOTIVE TECHNOLOGY

There is considerable need for training in the area of automotive technology. The automotive technical trades are not attracting the high caliber men needed to work on today's equipment. Tucson's present supply of new personnel comes from the reservoir of people who move to Tucson for their health. Junior colleges can help train these people in the automotive field. Specialists, such as transmission men, should be able to do other automotive work in order to utilize their time fully. The possibility of a core automotive program which would branch to either auto sales or mechanical areas was suggested.

Automotive technology employees also need to improve their communication skills for work in the sales and service fields. The workers would find applied psychology courses of value. The ideal automotive service manager should have a good technical background, be an A-1 mechanic and excellent diagnostician, and have the ability to work effectively with employees and customers.

Good automotive and diesel engine mechanics are definitely needed. Those now available have been trained at their employer's expense, which often costs the company as much as a college education. Mechanics are also needed in the mines and by large contractors who employ their own mechanics to service their heavy equipment.

In other areas, the automotive firms are asking for clerical help who are trained as title clerks and know how to process factory claim forms. Body and fender repairmen are also needed. Service station attendants receive some training in the high school programs, although automotive is classified as a hazardous occupation under Arizona law and not open to students under 18 years of age.

The National Automobile Dealers Association has appropriated $150,000 to inaugurate college level courses in automotive fields. Some of these courses are in operation at Midland, Michigan and the University of Detroit. The community college should investigate the possibility of obtaining such financial aid.

D. LAW ENFORCEMENT, FIRE PREVENTION AND SECURITY TECHNOLOGIES

The Tucson Police Department urges that the police science courses offered by the junior college be coordinated with courses now in effect at the University of Arizona. Recruits for Tucson city police department now have two years of college training and will likely need four years of college soon because requirements are expected to increase. The department, according to their representative, is interested in college courses transferrable for credit toward a four year degree. The program now provided by the police department and the university applies only to people already in the police department. This suggests that the college investigate ways they may coordinate programs with the state university.

All Highway Patrolmen are presently trained for five months in the Highway Patrol's Academy, which uses Northwestern graduates as instructors. There are 40 Highway Patrol Officers in Tucson who might be interested in supplementing this training through the junior college for upgrading purposes.

Manpower replacement needs for the area follow: The Sheriff's Office normally replaces eight to ten men per year. This year they are switching to a 40 hour week and will hire about 25 new men. The city police replace about 60 men per year and hope to recruit men from the junior college to continue through the academy quarter system for a four year degree. The Border Patrol meets its needs through national recruiting and trains men at its academy in Texas. The Forest Service personnel normally require a four year degree in forestry but feel that supplementary courses in law enforcement would be of value. The private security forces are recruited entirely from trained persons who come to Tucson after retirement from the armed forces and require little additional training. The Fire Department is upgrading its standards and needs an agency to assist in training personnel.

The law enforcement agencies believe that any supplementary junior college programs should be tailored to community needs and that courses in composition and writing should be included. Evening courses would be desirable. Classes which the various agencies recommended include constitutional law, search and seizure, public relations, civil rights, riot control, and community culture. The possibility of a college crime lab similar to the lab program at Miami-Dade Community College in Florida was discussed. Additional courses recommended were abnormal psychology, interrogation, social case work, and social group work. The men prefer to have these courses taught, whenever possible, by men experienced in actual police work; the demand is for the practical as opposed to the theoretical.

It appears that there is need for educational programs in police science, fire protection, and security work. Proposed programs should be coordinated with existing related educational offerings.

E. PERSONNEL SERVICES

The junior college is not expected to compete with existing business schools. A broader, more liberal education will be afforded by the junior college. In addition to the specialized instruction concerning job terminology and fundamentals necessary for such jobs as medical transcribers, legal secretaries, etc., the college will teach the appropriate theory and provide general education.

There is a real need for training in retail selling and merchandising, but it was pointed out that an upgrading of personnel would necessitate a corresponding increase in retailing salary schedules, which are unusually low in Tucson. The tourist industry also has a shortage of appropriately trained personnel, particularly in supervisory positions.

Trained sales personnel and appliance repair workers are in short supply in the retail industry. We did not assemble a group of retailers, per se, but instead talked with selected prospective employers to substantiate this need for skilled workers.

Mr. Joseph Metcalf of Sears Roebuck Company, for instance, suggested a retail laboratory at the new college where various retailing skills could be taught. He said the retail industry would gladly participate by giving lectures, critiques, and demonstrations. Also in demand are programs for appliance repairmen. The climate appears excellent for the establishment of these kinds of educational programs, with on-the-job training and college-industry co-op programs.

As in the other instances, no attempt is made here to spell out this occupational curriculum or the specific skills needed. The college administration working with advisory committees will later make such decisions.

The survey of Pima County students attending Arizona junior colleges, 1966-1967, showed that secretarial and other business or middle management courses are a priority need of the Pima students.

F. AIR CONDITIONING AND REFRIGERATION

A severe shortage of trained young people in the air conditioning and refrigeration areas is projected. In the next three years alone it is anticipated that 1,000 newly trained persons could be employed in this field.

Two types of programs are envisioned at the community college level. The first involves training the "nuts and bolts" mechanic to install air conditioning and/or refrigeration. This program is currently under the direction and supervision of the trade union, and college officials will want to coordinate with labor officials.

A second type of program might be termed the "heat exchange" program. This is a technical curriculum designed to lead into sales engineering, manufacturer's representatives, and supervisory positions. This would not conflict in any way with the labor union's mechanical programs. The heat exchange program would be open to high school graduates, possibly those with some intention of continuing on later for a university degree. Trainees under both programs would require courses in chemistry, physics, and some mathematics.

The introduction of a course called "Instrumentation" was suggested. This would build on the "heat exchange" program but would give instruction in automobiles, homes, apartment houses, large and small commercial installations, schools, shopping centers, and major industrial operations.

G. HOTEL, MOTEL AND FOOD SERVICE PROGRAMS

Participants in this discussion cited an urgent need for trained personnel in the hotel, motel, food and beverage service industry, and pledged their assistance in planning the curricula, presenting lectures at the college, and arranging on-the-job training opportunities.

The emphasis should be upon practical application rather than theory. In both administration and in food and beverage areas, people are needed for the positions of desk clerks, hostesses, chefs, bakers, cooks, pantry men, waitresses, and middle management type employees.

There should be long and short term courses for young people and adults, and the curricula should include classes for entrance workers as well as refresher courses for practitioners.

The idea of a motel-restaurant laboratory on the campus was introduced and it was well received. The lab was envisioned as a motel with about 20 sleeping rooms and other related space designed for easy expansion, which could accommodate adults in residence for a brief concentrated course pertaining to the hotel, motel industry. The facility would also be ideal for additional on campus adult housing. The idea of a residence educational center which houses adults during their brief career training may appeal to foundations or may qualify for federal subsidy.

H. MISCELLANEOUS EDUCATIONAL NEEDS OF OLD TUCSON

Mr. Robert Shelton, General Director of Old Tucson, was interviewed regarding the future employment needs for Old Tucson activities. He reported that the proposed expansion of Old Tucson facilities by erection of a sound stage will call for a significant number of skilled employees. The present campaign to raise funds for the sound stage is only a few thousand dollars from its goal and the completed stage should be ready for use by October, 1967. They hope to build a second stage within another year.

After the sound stage completion, the following technicians will be needed: electricians, special effects, make-up, hair dressers, painters, set builders, sound systems and transportation. Seventy-five per cent of any crew making a motion picture consists of the above types of technicians. They are accompanied by a business staff of accountants, advertising, marketing and merchandising personnel, salesmen, photographers and secretaries.

Approximately 40 persons are now employed by Old Tucson. Presently when a picture is made, the technicians must be imported from California. With the completion of all the proposed facilities, the employment need in Tucson will greatly increase.

Mr. Shelton volunteered to help plan the specific types of programs which would be needed. He added, "I am very much interested in the junior college movement in Tucson. There is a great need in our industry for young people with talent and executive potential who can work their way up the ranks into leadership and executive positions. The motion picture industry also needs a program of research which should be on the university graduate school level."

Educational training needs of Old Tucson appear to relate to the college programs in electronics, business, and drama.

I. MIDDLE MANAGEMENT TO SUPPORT THE SEVERAL OCCUPATIONAL FIELDS

The Pima County Community College has an excellent opportunity to create a broad based middle management program designed to accommodate a variety of occupational curricula.

Throughout the many discussions with the representatives from various occupations, a common need came into focus--the need for an employee who understood the practical, who could communicate, who could, within the established framework, make decisions, and who could work well with people. The need for an employee with these qualities is in itself not unusual, but it would be unique if the college administration chose to build one curriculum of common learning for middle management students, whether they were to major in agriculture, aviation, auto mechanics, health education, sales, hotel and motel, etc., and then to add the special learning necessary for the specific occupational fields. Such a curriculum would be a contribution to the junior college field. It would also afford economies because the common instruction would be grouped into single presentations to be enjoyed by all students, regardless of major.

J. AVIATION

The point was made that Tucson, Arizona, is rapidly becoming a strong aviation center. Pilots from other nations are given oreintation flight training at Tucson, and new aviation equipment is being tested there also.

Representatives of airlines stressed the need for pilot training because when the United States is not at war, sufficient pilots are not trained. The University of Arizona, it was learned, is introducing flight training and a program in aeronautical engineering. The University programs will offer both two and four year curricula. It appears that the pilot needs of the airlines may be best met by the university and not duplicated by the community college. The community college may well wish to offer pilot training with the emphasis upon light aircraft to supply the needs of "general aviation." The pilots needed in 1975 will likely be four to one in general aviation over airline service.

A supersonic jet training center which would need many technical support people, may come to Tucson.

The Hamilton Aviation Company needs 75 aviation mechanics now. They strongly urge the establishment of FFA licensed courses in air frame and power plant mechanics. These are two year technical programs which are FFA approved. Generally, when it is offered by the junior college, there is one hour of lecture for every three hours of shop. The shop or laboratory work may be obtained through Hamilton. It was reported that positions range from $8,000 to $10,000 for mechanics who are licensed by FFA as air frame and power plant mechanics. The representatives made the point that technical staff could be found and that the airlines themselves would be pleased to assist in serving on advisory panels, presenting lectures, and serving in all ways they could. Tucson Airport personnel would be pleased to cooperate also. On-the-job training could be handled locally.

Meteorologists, it was reported, are not in sharp demand. It is not recommended that stewardess training be provided by the new college as the airlines are finding sufficient girls and they are doing their own training.

Although commonly overlooked, there are many positions in aviation not connected to the airplane itself. The aviation industry needs middle management personnel, secretaries, secretarial-clerical help. There is great opportunity for trained sales people.

In summary, it appears that there are four good possibilities for the Pima County Community College in aviation. The four are listed in the order that they are likely to be initiated.

1. A middle management program to develop employees for sales and reservations and general administration
2. Pilot training for light aircraft for general aviation (as opposed to the University of Arizona program which is related to airline pilots)
3. Aviation mechanics
4. Technical support program operated to train employees for the federal government

K. AGRICULTURE

Mr. Carlos H. Moore, State Supervisor, Agricultural Education, discussed agricultural programs at three California junior colleges--Modesto Junior College, College of the Sequoias, and Mount San Antonio. These colleges enroll 4,700, 2,000 and 5,000 students respectively. The colleges differ in the number of college-owned acres devoted to agriculture. Modesto has two acres and recommends from five to ten as ideal. College of the Sequoias has 160 acres which were donated by the community, while Mount San Antonio College has 250 acres. Modesto Junior College, with the lowest number of college owned acres devoted to agriculture, depends upon the community for its demonstration plots, whereas the other colleges own their own farms.

Several points were made during Mr. Moore's discussion: 75% of University of Arizona freshmen in agriculture do not come from agricultural backgrounds.

California has a rule of thumb--if a junior college cannot build an agricultural program to accommodate a staff of three instructors, they cancel the program as the California State Department of Agriculture feels that the program is not broad enough. California junior colleges bus their agricultural students as do the high schools. The junior colleges in California found that the teachers who were teaching agriculture in the high schools make the best junior college agriculture teachers.

Initially, in the agricultural program, it is very important to recruit students. Once established as a quality program, it will continue to grow. Girls, too, are in the California junior college agriculture programs.

Club activities are important in agricultural programs in the junior college, but these activities should be different from those of the high school clubs.

The following are critical items suggested by personnel who have built successful junior college agricultural programs:

1. Get the agricultural program started early in the formation of the college
2. Employ a very capable teacher who
    a. has organizational ability,
    b. is familiar with the agricultural activities in the area, and
    c. is respected by the agricultural leaders in the community.
3. Distribute the work load of the teacher to provide at least one half time for organizational efforts and planning during the first year.
4. Place the teacher on an extended contract. (11 or 12 months)
5. Have the instructional staff and administration work closely with the Agricultural Advisory Committee in the planning of the agricultural program.
6. Keep the program up-to-date by continuous evaluation, surveys to determine occupational need, and follow-up of students after placement.
7. Establish and maintain an active agricultural youth organization.

Following Mr. Moore's report, the agricultural representatives discussed the acreage recommended for an agricultural program at the Pima County Community College. It was the concensus that Casa Grande and Mirandi, which are University of Arizona farms located close to the junior college site, would not substitute for junior college owned farmland, as the University of Arizona sites would be available for junior college observation only. The point was also made that agriculture at the university is experimental while at the junior college, agriculture is practical.

There is not agreement on the number of acres necessary for the junior college agricultural programs; estimates vary from two to forty acres.

Three purposes for the junior college agricultural program were cited:

1. Preparatory courses for transfer to the university
2. Terminal two year technology programs
3. Special training consisting of seminars, demonstrations--short courses for workers in agriculture who are preparing for special tasks and are not interested in degree programs

The new junior college should recognize two kinds of students entering college agricultural programs from the high schools:

1. Those who have taken agriculture in high school
2. High school graduates who have not taken any agricultural work in high school. For these an orientation course is suggested.

Because agricultural equipment is becoming highly sophisticated and salaries are rising, more is expected of the workers and they must have more education. The educational experiences which the agricultural technician need, according to the discussants, are farm equipment repair, shop welding, vocational-electrical work as pertaining to practical agriculture and theory, farm record keeping, maintenance, and orientation to farm equipment and machinery. Carburetion and hydraulics are most important, as are animal husbandry, agricultural chemistry, botany, and agricultural mathematics.

The point was made that equipment companies and local farmers will loan machinery and equipment for demonstration purposes.

In summary, one can say that what is needed is a well educated technician who has a broad orientation to the entire agricultural field and specific [illegible] should be able to make decisions for they will be engaged in supervisory or middle management agricultural positions.

L. OPTICAL TECHNOLOGY

The optical field is important to the Tucson area, but it appears that labor requirements are such that not more than 10% of the graduates of a program offered by the Pima County Community College would be employed in the state of Arizona.

Four year degree programs in optics are offered at the University of Rochester and at two or three other universities in the United States. There were no optics technology programs identified at any public community colleges, although the Los Angeles College of Optics, a non-public institution, is said to offer a three year program in opthalmic optics. It was suggested that a similar program may be investigated as a proper course for a community college.

A technology program in optics would be based at a high mathematically academic level. The program would be concerned with theories of light, prisms, mirrors and would contain mathematics, chemistry and physics.

It was reported that the University of Arizona planned a program in optics, and if the community college approached this career from a point of view of applied optics, teaching the mechanical functions, graduates from the college could support the professional persons in optics who would graduate from the university. Since Tucson, and even Arizona itself, could not utilize all of the graduates from a two year optics program, it was realized that this would have to be a regional offering drawing from other states as well as from Mexico. There is a possibility that the junior college could offer co-op programs with the optical firms in Arizona and at Hughes Aircraft. Bausch and Lomb now has an office in Tucson and, while they did not send a representative to the meeting, it was thought that they would be interested in such a program.

Much special equipment could be borrowed from the optical companies. Another possibility is the acquisition of government surplus property from the Frankfort arsenal, which is closing out its optics program in the immediate future. It was the concensus that optics is not a high priority program for the Pima County Community College but one which should be investigated, and if a proper program could be established with good cooperation from industry, the students could then be recruited on a regional basis.

V. COORDINATING THE OCCUPATIONAL EDUCATION PROGRAMS

Occupational education courses should be established to supplement and complement those offered by private organizations, public schools and the university. There should be close cooperation to avoid costly duplication, but the community college must not appear willing to pick up the odds and ends unwanted by other educational and training organizations. The curricular planning at Pima County Community College should be done with full awareness and appreciation for the total educational resources of the area.

The study of community college possibilities reported, "the University of Arizona has offered special educational courses in the fields of distributive education and other non-credit courses have been offered since 1964. In the spring of 1966, over 500 students were enrolled in twenty non-credit courses, and 125 were enrolled in five distributive education courses. The University of Arizona offers local employers an excellent source of managerial and technical employees. Recently completed studies indicate that the graduates have a strong geographical preference for living in the southwest and, more specifically, Tucson. In addition to the resumes of the graduating class, the Placement Office of the University maintains an extensive file of graduates of previous years, now scattered across the country, who have indicated a desire to return to Tucson if a suitable opening arises."

Other Universities and Colleges in Arizona: In addition to the University of Arizona in Tucson, there are two other state supported universities. Arizona State University is at Tempe, 120 miles from Tucson, and has an enrollment of approximately 17,000 students. Northern Arizona University is 250 miles from Tucson with an enrollment of 2,700 students. There are community colleges located at Phoenix, Thatcher and Cochise.

Occupational education programs offered at the three Arizona community colleges were examined. The analysis revealed some interesting facts which could serve as guidelines for the Pima County Community College development. The Maricopa County Community College conducted a follow-up study of students enrolled in occupational education curricula and discovered that the per cent of students remaining in their occupational curricula after one year of college attendance is about equal to the number of students who completed one year in the university transfer program. Approximately one half of all freshmen students who registered in semi-professional technical curricula did complete one academic year in the program.

About one third of all students registered in the occupational curricula dropped out of college during the first college year for "personal matters," "military service" and "financial needs." The registered nurse program and drafting technology curricula had the highest retention rate for students. The study suggests that to increase retention power of the occupational programs, attention be given to the establishment of admissions to these curricula; e.g., as students are better selected for admission to the various programs, they have a better chance of remaining to complete them. Again, the strong suggestion was made that the counseling program must be well developed and must utilize all modern means and techniques to insure wiser decisions on the part of students seeking employment objectives.

Family Core Plan for Occupational Education: Occupational education is frequently cited as being more costly than general or liberal education. Instructors work with fewer students, larger instructional spaces are required, the curricula are specialized, and special equipment is generally needed. For these and other reasons, the faculty should develop a core program for family occupations.

Since occupational education curricula include both general and special learning, they should be planned to take advantage of the general learning which can be accommodated through a central core program.

Professor Norman Harris, also writing in Emphasis: Occupational Education in the Two-Year College, suggests a "Core Curriculum." Referring to his diagram (Figure 1), he states:

> "A careful review of the proposed flow of students as indicated in the chart (p. 33) reveals two basic directions in which pre-counseled students may proceed. Fully qualified students may enter immediately into general education and basic core subjects. Those students with deficiencies move into a one-semester developmental program. It is, thus, obvious that the "open door" college has many "closed door" curriculums. Granted that testing, interviewing, and an exact science of [illegible] do not add up to ble to allow students to enroll in any curriculum or course which suits their fancy. Every college will have to set the end-product standards it will require for completion of its courses and curriculums. To a certain extent these end-product standards will determine entry standards into courses and curriculums, since there are obviously limits to what can be accomplished in a two year program.
>
> "Despite the gradual improvements of standardized tests, the best single predictor of college performance is still high school grades. Most certainly, however, high school standing should not be used as a sole criterion. Several measures for prediction are always better than one, and a philosophy of flexibility should govern the student selection process.

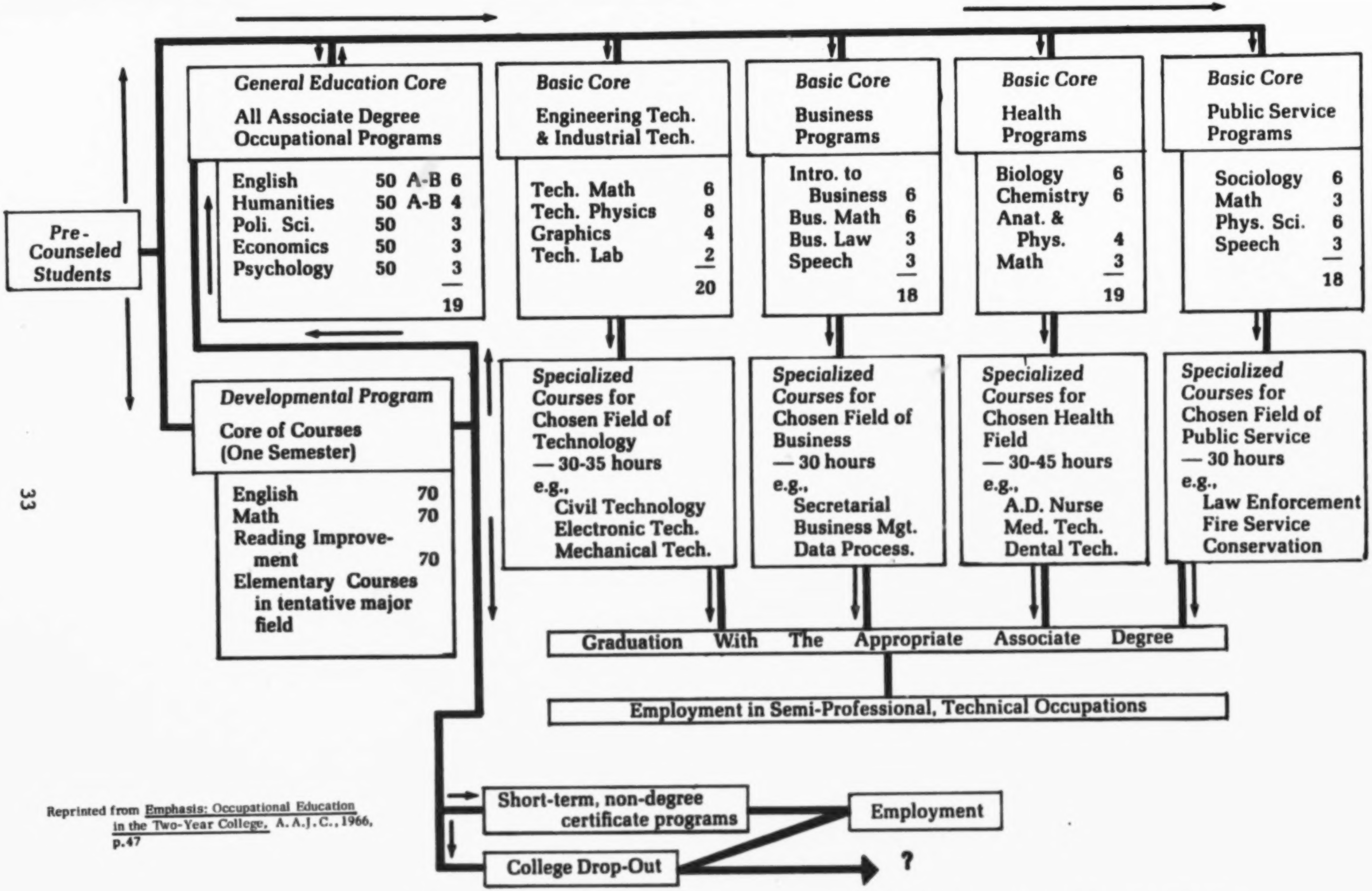
Pre-Counseled Students
General Education Core
All Associate Degree Occupational Programs
English 50 A-B 6
Humanities 50 A-B 4
Poli. Sci. 50 3
Economics 50 3
Psychology 50 3
19
Developmental Program
Core of Courses (One Semester)
English 70
Math 70
Reading Improvement 70
Elementary Courses in tentative major field
Basic Core
Engineering Tech. & Industrial Tech.
Tech. Math 6
Tech. Physics 8
Graphics 4
Tech. Lab 2
20
Basic Core
Business Programs
Intro. to Business 6
Bus. Math 6
Bus. Law 3
Speech 3
18
Basic Core
Health Programs
Biology 6
Chemistry 6
Anat. & Phys. 4
Math 3
19
Basic Core
Public Service Programs
Sociology 6
Math 3
Phys. Sci. 6
Speech 3
18
Specialized Courses for Chosen Field of Technology — 30-35 hours
e.g., Civil Technology
Electronic Tech.
Mechanical Tech.
Specialized Courses for Chosen Field of Business — 30 hours
e.g., Secretarial
Business Mgt.
Data Process.
Specialized Courses for Chosen Health Field — 30-45 hours
e.g., A.D. Nurse
Med. Tech.
Dental Tech.
Specialized Courses for Chosen Field of Public Service — 30 hours
e.g., Law Enforcement
Fire Service
Conservation
Graduation With The Appropriate Associate Degree
Employment in Semi-Professional, Technical Occupations
Short-term, non-degree certificate programs
Employment
College Drop-Out
?

FIGURE 1 SUGGESTED CORE CURRICULUM PLAN LEADING TO ASSOCIATE DEGREE IN OCCUPATIONAL EDUCATION

Reprinted from Emphasis: Occupational Education in the Two-Year College, A.A.J.C., 1966, p.47

> With respect to standardized tests, several have been used long enough and widely enough to be of considerable value in prediction, when used in conjunction with other measures.
>
> "There is a wide range, or difference in difficulty level, however, in junior college occupational programs. This range is so great that a junior college which claims to be an "open door" will have to provide two or more levels of occupational education programs--some curriculums at the semi-professional or technical level, some at the skilled level, and perhaps some at the semi-skilled level."

Occupational education courses offered by the Arizona junior colleges were analyzed to learn what occupational programs the Pima County students prefer and what gaps exist in total state vocational offerings.

The 475 Pima County students enrolled in Arizona junior colleges, 1966-1967, selected Eastern Arizona, Cochise, Arizona Western and Maricopa County in the order listed. Freshmen outnumbered sophomores 381 to 94 and the men outnumbered the women by 353 to 122. A majority of students were enrolled in transfer curricula, as would be expected, since this follows the national trend. About 30% of all Pima County students selected occupational curricula. with automotive technology, police science, drafting technology, general business, and secretarial being favored.

This brief survey of student enrollment during one year must not be over emphasized, but it is of interest to note that the Pima County students attending Arizona junior colleges are distributed by major in accordance with the national trend with about 70% in liberal arts or general education and about 30% in the occupational fields. Findings revealed the following:

TABLE 2

PIMA COUNTY STUDENTS IN OTHER ARIZONA JUNIOR COLLEGES, 1966-1967

	Freshmen			Sophomores			Total Enrolled		
College	Men	Women	Both	Men	Women	Both	Men	Women	Both
Arizona Western	54	23	77	23	6	29	77	29	106
Cochise College	78	29	107	19	8	27	97	37	134
Eastern Arizona	103	36	139	25	7	32	128	43	171
Maricopa County	46	12	58	5	1	6	51	13	64
Total:	281	100	381	72	22	94	353	122	475

TABLE 3

DISTRIBUTION OF PIMA COUNTY STUDENTS BY CURRICULA

Occupational Curricula	Western Arizona	Maricopa	Eastern Arizona	Cochise	Total
Advertising Art	1				1
General Art					0
Photography		2			2
Agricultural Business Management	4				4
Citrus Fruit Management					0
General Agriculture Production	1				1
Ornamental Horticulture	1				1
Agricultural Mech. Tech.					0
General Business	6	2	3		11
Office Administration	2		2		4
Office Services (Secretarial and Clerical)	2	2	2	4	10
Data Processing	1	2		1	4
Middle Management	2		2	2	6
Public Administration					0
Real Estate					0
Automotive Business Management					0
Medical Receptionist, Secretary				1	1
Medical Records Tech.					0
Nursing (RN)		1			1
Nursing (LPN)				3	3
Medical Technology					0
Cancer Detection Tech.					0

TABLE 3 (cont'd)

Occupational Curricula (cont'd)	Western Arizona	Maricopa	Eastern Arizona	Cochise	Total
Automotive Technology	4		14		18
Automotive Mech. Training			5		5
Drafting Technology	2	2	3	5	12
Vocational Drafting Training					0
Civil Engineering Tech.					0
Mech. Engineering Tech.	1		1		2
Metal Technology	1				1
Electronics Engineering Technology	2		2		4
Electronics Technology					0
Industrial Technology	1		4		5
Surveying Technology					0
Fire Science					0
Police Science				15	15
Occupational Home Econ.					0
Child Care (Day Center Adm.)	1				1
Food Service Admin.					0
Fashion Design					0
Total Occupat. Curricula	32	11	38	31	112
Total 2 Yr. General	5	20	9		34
Total Occupational Prog.	37	31	47	31*	146

TABLE 3 (cont'd)

Transfer Curricula	Western Arizona	Maricopa	Eastern Arizona	Cochise	Total
Liberal Arts	18	11	42	87	158
Education	11	2	10		23
Pre-Professional	3	10	15		28
Health, P.E., Rec.	9	4	10		23
Fine Arts	3		9		12
Business Administration	7	6	22	16	51
Home Economics	5		9		14
Agriculture			7		7
Total Transfer:	56	33	124	103	316
Others: No Record	13				13

SUMMARY

College	Occupational Programs	Transfer Programs	No Record	Total
Arizona Western	37	56	13	106
Cochise College	31	103		134
Eastern Arizona	47	124		171
Maricopa County	31	33		64
Total:	146	316	13	475

1. Pima County Public Schools

The Pima County public schools offer programs in vocational rehabilitation in cooperation with the Arizona division of vocational rehabilitation, and they have a rather complete offering in vocational and technical education as well. Discussions with officials of Tucson High School District #1, which offers much of the vocational work through its adult evening school, were very cordial and revealed a cooperative attitude toward the community college. We feel that many of the courses the public schools are offering might more properly be offered at the Pima County Community College. Reasons for the future transfer of such work are:

1. Programs are in some instances post high school in nature.
2. Adults would prefer to attend the community college rather than high school evening classes.
3. Adult education generally is being turned over to the junior colleges as high schools are sufficiently occupied with providing for students in the high school age group.

Programs now offered in the adult evening school by the Tucson public schools which may be desirable to transfer to the community college at an appropriate time in the developmental stage of the college are: air frame power plant refresher; auto mechanics; advanced computer programming; data processing; electronics; advance refrigeration; and licensed practical nursing.

Later in the developmental sequence of the Pima County Community College, other programs could be taken over by the college as agreed upon by the administration of the institutions concerned. These arrangements must be made only after very careful investigation and must have the cooperation of all persons concerned. The attitude of the administration of the Tucson public schools is most excellent in this regard as they state that they had entered this field of educational endeavor because there had been a demonstrated need. They also report that when the Pima County Junior College is organized and desires to assume responsibility for these functions, they will be very willing to work the matter out.

Careful planning and articulation is called for so that the fine relationships may be continued and so that the students, degree-bound and adult, may be better served. Channels of communication should be established with the universities, public secondary schools, organized labor, and private educational organizations.

B. SUGGESTED OCCUPATIONAL EDUCATION PROGRAMS

From the many sources indicated in the foregoing chapter, it is possible to predict sufficient interest on the part of students and sufficient demand on the part of employers to establish educational programs in the following initial occupational areas. Exact course offerings, subject matter content, and field experience are to be determined by the college staff. Additional occupational area training programs and career courses should be explored as soon as practicable.

1. Hotel, Motel, Food and Beverage Services

a. Hotel-Motel Desk Clerk

The duties of the hotel-motel clerk include the taking and confirming of room reservations, greeting arriving guests, attempting to meet guests' preferences concerning accommodations and other matters; handling registration, room keys, mail, messages, room payments; notifying the housekeeper of arrivals and departures, etc. The hotel-motel clerk may be required to operate the PBX or a cash register with machine bookkeeping features and generally handle guests' accounts and minor guest and staff related problems.

Necessary skills include good spoken and written English, bookkeeping, typing, PBX operation, filing of records, and a knowledge of basic psychology and general public relations. The training program would require two years of general education and specific skills courses for either the A. A. or certificate.

b. Assistant Manager

Hotels, motels, and larger restaurants need assistant managers, whose duties and skills would include those of the above mentioned desk clerk position plus some accounting, food service management and catering, building operation and maintenance supervision, and general customer service relations. Required skills include good spoken and written English, basic accounting, knowledge of food service operations, basic psychology, and public relations. The two year A. A. training program would require both general education and special courses (i.e. accounting, food services, etc.) and some field observation. A middle management program is recommended to accommodate this and other occupational fields. Please see p. 50.

c. Hostess (Restaurant and Hotel)

Women in hostess positions in restaurants and hotels provide a friendly welcome for patrons, arrange for banquets, parties, customer seating, help satisfy customer complaints, help insure courteous service by all staff personnel, and sometimes provide other special services. Required skills include good spoken and written English, some knowledge of the food services operation, psychology, and public relations. A one year certificate program could be developed.

d. Cook

Duties of a cook vary according to the type of restaurant or institution (e.g. hospital, school, ship, hotel, construction camp, drive-in restaurant, restaurant, etc.), but basically they consist of the planning, ordering, and preparation of foods.

Skills required in addition to spoken and written English include knowledge of roasting, baking, broiling and other methods of food preparation; use and care of modern kitchen equipment; proficiency in selection and storage of foods, menu planning, determination of quantity of food to purchase and prepare, purchasing, restaurant sanitation and safety, and knowledge of public health regulations. The field is open equally to men and women, but most chefs in top restaurants are men. The training program would require two years for an A. A. and/or certificate.

e. Baker

Duties of a baker include the planning of bakery production, ordering of materials, the blending, sifting, mixing, proofing and baking of materials (for bread, cakes, pies, cookies, etc.) and the wrapping or packaging of the products. With increasing mechanization in the larger bakeries, areas of work specialization are becoming more pronounced. However, the basic skills of the trade continue to be spoken and written English, knowledge of materials, familiarity with the operation of modern bakery measuring and mixing machinery and ovens, safety, and sanitation. A two year A. A. and/or certificate program could be developed.

f. Waitress - Waiter

Duties of the waitress and waiter include taking customer's orders, relaying the order orally or in writing to the appropriate personnel, serving the food or beverage, making out customer's checks, and sometimes taking payment. Basic required skills include spoken and written English, accurate arithmetic, and some knowledge of the food services operation. A one year certificate program could be developed.

2. Para Medical Services

a. Registered Nurse

Duties of the Registered Nurse include administering medications, blood transfusions, and other types of treatment prescribed by physicians; observing, evaluating, and recording patient symptoms, reactions, and progress; and the instruction of auxiliary personnel and student nurses. Hospitals employ two thirds of the nation's nurses, and demand always exceeds the supply. A two year A. A. training program would include highly technical courses in science (including physiology), math, English, psychology, laboratory practices, public health, as well as basic nursing techniques. In the state R. N. licensing examinations, A. A. recipients must compete with the graduates of the three to five year hospital and university training programs.

b. Licensed Practical Nurse[1]

The Licensed Practical Nurses are also called Licensed Vocational Nurses. Persons of this occupational group are employed by hospitals, nursing homes, and clinics, and they assist in caring for medical and surgical patients, convalescents, handicapped and physically or mentally ill persons. Under the direction of physicians and Registered Nurses they care for patients whose illness is not at a critical stage. For example, they take and record temperatures and blood pressures, change dressings, administer medicine, bathe patients, and assist with the care and feeding of infants. Many persons are employed in private homes.

All states regulate the training and licensing of practical nurses. A two year A. A. and/or certificate training program, with emphasis on bedside skills, nutrition, and personal hygiene, could be a modified version of the above mentioned R. N. program.

c. Medical Technologist

Duties of the medical technologist are to conduct laboratory tests to assist pathologists in the detection, diagnosis, and treatment of disease. Such tests include determining blood counts and cholestorol levels, and examining body tissue samples microscopically to determine the presence of bacteria or other organisms. The field is open to both men and women. Most persons are employed in hospitals and public health agencies.

An A. A. training program would include extensive study in chemistry, biology, mathematics, and laboratory equipment and techniques.

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[1] Program presently offered by the Tucson public schools adult education which should be phased into the college.

d. Inhalation Technologist

The inhalation therapy program may be offered at three different levels as is done at certain other community colleges.

A one semester program would prepare the student to be an inhalation therapy assistant; a one year program would prepare the student, after completing a year of clinical experience, to take the certification examination given by the American Registry of Inhalation Therapists. A third program of two years in length would enable graduates to work at supervisory and administrative levels and, after further experience, to aid in the teaching of inhalation therapy. A certificate and associate degree program are indicated.

e. Hospital Admitting Clerk

The pulse of any hospital is the admitting office where comprehensive records of patients are maintained. Admitting office personnel determine medical, financial, or geographic eligibility for admission to the hospital, in terms of hospital policy. They control the number and type of patients, and complete the necessary admission documents. By alerting all departments concerned, they set in motion the machinery vital to the patient's care. By phone or mail, the clerk obtains information concerning the patient's financial status and insurance coverage. Master scheduling of all hospital rooms (including operating rooms) and personnal may also be among the duties of the hospital admitting clerk.

An A. A. and/or certificate training program would include written and spoken English, typing, bookkeeping, psychology, and a general knowledge of hospital services.

f. Ward Medical Clerk

Ward medical clerks are usually employed in hospital wards to assist the physicians and nurses in keeping accurate patient records. These include information related to patients' condition on admission, information about treatment or surgery, medical and drug reports. Ward medical clerks must prepare and file all necessary records and correspondence.

Necessary skills include written and spoken English, record filing, typing, and a general knowledge of hospital services. A one year certificate training program could be developed.

g. Medical and Dental Assistant

Duties of the medical and dental assistant include preparing patients for the physician's or dentist's examination and/or treatment, organizing all needed supplies, instruments, and other equipment in readiness for each patient's appointment, and handing these to the physician or dentist at his request. The assistant is responsible for instrument sterilization and care and for storage of equipment and supplies. Clerical tasks may include making appointments; serving as receptionist; typing and maintaining case records, financial accounts, and related correspondence; and billing patients. Some laboratory and X-ray work may also be included.

An A. A. and/or certificate training program should stress written and spoken English, typing, bookkeeping, science, psychology, and knowledge of medical-dental procedures and terminology.

h. Dental Chairside Assistant

Duties of the dental chairside assistant include seating the patient in the dentist's chair, covering the patient's clothing with a neck towel or apron, adjusting the chair height, handing the dentist the correct instruments on request, mixing of cements, amalgam, silicates and other filling and impression materials, operation of salivation pump, etc. Some clerical duties may also be required. The training program would be somewhat similar to the medical-dental assistant's program but with stress on the chairside skills.

The National Dental Assistants Association will recommend a two year community college curriculum leading to an A. A. degree and/or Certificate of Occupational Competency that includes a semester of one day a week supervised experience in a dentist's office. Graduates of such a program are readily employed at higher salaries than on-the-job trainees.

i. Dental Hygienist[1]

Major duties of the dental hygienist are to clean teeth and teach patients the proper way to care for their mouths between regular dental visits. They usually work under the supervision of a licensed dentist. They chart conditions of decay and disease for diagnosis by the dentist. They may also take and develop X-rays, mix filling compounds, sterilize instruments, and assist the dentist in various procedures. Increasingly schools and public health clinics are employing dental hygienists.

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[1] A need is indicated, but the dentists observed that Maricopa Junior College is starting a program.

A two year professional training program leading to either an A. A. or a certificate should stress English, science (chemistry, anatomy, pharmacology, etc.), plus dental procedures, equipment and terminology. In either case the graduate must pass a licensing examination given by the state board of dental examiners in the state in which she wishes to practice. She (there are currently few men in the field) becomes a registered dental hygienist and is permitted to use the initials R.D.H. after her name.

3. Electronics, Electrical and Mechanical

a. Mechanical Technology

This is a broad term used to cover such fields as machine and tool design, production and automotive technology and similar fields. Trained technicians in these fields assist the mechanical engineers in design and development of factory and other types of machinery and equipment. They also help eliminate production problems. For example, the tool designer originates and draws the plans for cutting, bending, or other attachments that are used in a machining or assembly operation.

The A. A. training program would include stress on mathematics, science, drafting, metallurgy, plus some laboratory experience with machine and welding shop equipment, and field experience.

b. Electronics Technician

The varied duties of the electronics technician usually fall between those of the electrician and the professional electronics engineer or scientist. He may be in research, manufacturing, or electronic equipment installation and repair. He may work in many of the rapidly developing "space age" electronics fields such as computing, telemetry, radar-sonar, television-radio-UHF transmitting and receiving. Two thirds of the technicians in major aerospace plants work solely on testing and modification of radio, radar and other electronic equipment. They use such instruments as oscilloscopes, signal generators, and Q-meters in this testing and experimentation. The reading and preparing of technical reports and instructions are important skills.

The two year A. A. training program should stress mathematics, English, physical science, electronics theory, laboratory and field experience.

c. Instrument Technology

Manufacturers, utility companies, governmental agencies, and other employers use complex industrial and scientific instruments to measure time, volume, weight, temperature, pressure, and fluid flow, to record data, and to control and regulate the operation of machinery. Instruments and control systems, regardless of their activating mechanisms, are an integral part of automated mass production processes. It is the instrument technician who is responsible for service, repair, adjustment, calibration, or installation of replacement units for these instruments and control systems. He may install, test, or repair electronic, hydraulic, pneumatic or mechanical instruments and metering devices. He must have some of the knowledge and skills of the electrician, electronics technician, machinist, and the plumber. The reading of instruction manuals and writing of reports are essential skills.

An A. A. or certificate training program should include English, mathematics, blueprint reading, instrumentation theory, electronic and machine shop laboratory, and field experience.

d. Air Conditioning and Refrigeration Technology

Duties in the field of air conditioning and refrigeration technology include: (1) assisting engineers in the design, fabrication, and installation of complete cooling systems for buildings, and (2) maintaining and repairing existing systems and equipment. In designing the layout for a building's (or vehicle's) air conditioning system the technician must determine the cooling requirements, decide what kind of equipment is most suitable, and estimate all costs. Technical sales work for equipment manufacturers and local contractors is another open area of employment. The reading and preparing of instructions and blueprints are essential skills.

An A. A. or certificate training program should include English, mathematics, basic chemistry, mechanical drawing, machine-welding-sheetmetal shop laboratory experience, and field experience.

4. Automotive and Diesel Technologies

a. Diesel Engine Mechanic

The diesel engine mechanic is a specialist in the theory and application of diesel power and in the maintenance and repair of diesel engines. Sometimes he is known according to the type of equipment on which he works; he is called truck mechanic, heavy duty mechanic, farm equipment mechanic, marine diesel mechanic, locomotive machinist, or maintenance mechanic. He works to keep diesel and other equipment in good working order and to diagnose and take corrective action when necessary. Using power and hand tools, precision instruments, and testing devices, he replaces and repairs systems or parts which prove defective or show excessive wear. Good reading comprehension is required in order to understand service manuals.

An A. A. or certificate training program (possibly offered as part of a union-company approved apprenticeship) should include shop mathematics, blueprint reading, diesel engine theory, machine and welding shop experience, and field observation.

b. Automotive Technologist

The automotive technologist repairs and maintains automobiles, the most complex and expensive machinery commonly owned in America. He may be an all-round mechanic able to handle the wide range of jobs brought to the general repair shop, or he may be a specialist in one phase of his craft, such as automatic transmission repair or auto electrical work. Often he is able to make almost any kind of repair or adjustment from a simple engine tune-up to the complete disassembly and repair of the automobile's power train, but will, because of his special skill or because of tradition within the shop, spend most of his time on one or two specialties.

Ability to read instruction manuals and basic arithmetic skills are essential. An apprenticeship or certificate program should include blueprint reading and automotive and machine shop experience.

c. Automotive Service Advisor--Shop Manager

The automotive service advisor ordinarily possesses all of the skills of the all-round journeyman automotive mechanic and is able to diagnose customer automotive troubles and estimate the repair charges. He is the link between the customer and the mechanic in the shop. Employers usually choose experienced mechanical applicants who are courteous and tactful and possess good written and spoken English skills. A certificate training program would include commercial arithmetic, public speaking, salesmanship, and advanced automobile mechanics.

5. Business Technologies

a. Stenographer and Secretary

Stenographers and sectetaries both record dictation and transcribe it on the typewriter, operate various types of office machines, answer telephones, and perform other clerical and office management duties. Areas of specialization today include legal, medical, and scientific work, each requiring command of specialized vocabularies. Secretaries, in addition to their stenographic work, relieve their employers of numerous routine duties and often handle a variety of details on their own initiative. Increasingly men are entering the field.

An A. A. or certificate training program should stress English (spelling, punctuation, grammar, and vocabulary), typing, shorthand, office business machines, bookkeeping, and basic psychology.

b. Junior Accountant

Duties of the junior accountant include: (1) working with senior accountants or CPA's to compile, analyze (or audit) business records; and (2) to prepare financial reports, such as profit and loss statements, balance sheets, inventories, cost studies, and tax reports. In this work he must be skilled in the use of adding machines, calculators, and other data processing equipment. The growth of business, industry, and government is demanding more and more accounting services on all levels. Almost half of the states have laws that will, by 1970, require CPA candidates to be college graduates; the A. A. would be a logical first step. Such programs should stress mathematics, English, accounting principles, commercial law, taxation, auditing, and economics.

c. Electronic Data Process Programmer

The development of the computer presented a powerful new tool to mechanize clerical work, and as the machines have become more sophisticated, it is increasingly profitable to use them not only as colossal counting devices but as prediction, decision-making and control instruments as well. Working in consultation with management, the machine's programmer is responsible for basic research and planning of the problem's solution; he determines what information must be fed into the computer and what mathematical and logical operations the computer will perform. Despite considerable variation from one business or research problem to another, programmers have evolved a general methodology which can be modified to fit almost any job, whether it is computing a payroll, monitoring a complete production process, analyzing patterns of consumer buying, automating a distribution warehouse, or conducting aerospace research. This methodology involves research and defining the problem; analyzing data obtained in research and deciding on a general method for handling the computer; detailed planning of each step to be performed; translating these steps into machine operations through a coding system; and checking and correcting the program to be sure it will work on the computer.

The A. A. training program should stress advanced mathematics, English, logic, statistics, accounting, the use of data processing machines, and linear and dynamic programming.

6. Miscellaneous Career Courses

a. Police Science

The major responsibilities of policemen and policewomen are to help maintain law and order, to assist in traffic, and to function as accident-prevention agents. As city, county, state, or federal government employees they attempt to prevent criminal activities, investigate crimes, and apprehend and assist in the prosecution of offenders. Most city policemen are assigned to either patrol or traffic duty and cover their district or "beats" in a patrolcar or motorcycle or on foot. They prepare and turn in reports about their activities and observations and, in cases which result in legal action, they are sometimes called upon to give testimony in court.

An A. A. training program should stress written and spoken English, law and law enforcement, traffic safety, and basic psychology.

b. Sales Services (Retail and Wholesale)

Duties vary widely in the field of sales services--from the variety or dress store salesgirl and insurance or auto salesman to the industrial equipment sales "engineer"--but in all areas successful salespeople must have the ability to communicate effectively and courteously with their customers. Self-confidence, imagination, and self-discipline are also essential prerequisites in the selling field. A broad educational background can assist salespeople in meeting their various responsibilities.

An A. A. or certificate Distributive Education program should stress spoken and written English, basic arithmetic, psychology, salesmanship, merchandising, and business fundamentals.

c. Graphic Arts

The area of graphic arts includes most forms of visual artistic representation, especially painting, drawing, photography, lithography, and the lettering and general lay-out for advertising and other printed matter. The broad term "commercial artist" can cover persons in the printing-advertising fields, as well as designers of ceramics, textiles, furniture, or other art objects. Film animation and poster production are also growing employment areas.

An A. A. or certificate program in this field should stress commercial art, drafting or design, and photography.

d. Motion Picture and Television Technology

Duties in the motion picture and television technology industries include the work of the camera crews, lighting specialists, set designers, film editors, casting directors, actors, script writers, and public relations men. An A. A. or certificate program in this field could develop specialties in one or more of these occupations.

e. Fire Prevention

The fireman spends about 25 per cent of his time in actual fire fighting or in answering emergency calls to provide resuscitation or rescue service which might range from freeing a child in a locked bathroom to rescuing a pet cat on a telephone pole. The remainder of his time--as he waits for something to happen and hopes it does not--is spent in making inspections for fire prevention purposes, in public relations work, in fire drills, demonstrations, other training, and in maintaining apparatus.

Over 3,000 items of tools and equipment must be kept in operating order. These include hoses and nozzles, wire and bolt cutters, axes, various ladders, a wide variety of wrenches, life nets, pumpers, tankers, and aerial ladder trucks and all their auxiliary equipment. The fireman must be familiar with all types of building construction, all types of fires, arson techniques and methods of detecting same. Report writing is also an essential skill.

An A. A. or certificate training program should stress written and spoken English, building codes, chemistry, law, and fire prevention and control.

g. Appliance Repair

The appliance repairman usually goes to the customer's home to determine the nature of the repair problem of washers, dryers, etc. By questioning the owner and testing the equipment, he diagnoses the trouble and estimates the cost of the work, including parts replacement. If possible, he makes repairs in the home. If major overhaul is required, however, the appliance is taken to the shop. When equipment is returned to the customer, the repairman makes the necessary electrical, gas, or water connections and checks the operation of the equipment, often tactfully advising the customer how to avoid the problem again.

A certificate training program should include machine and electrical shop experience, English, mathematics, and field experience.

g. Cosmetology

Students of cosmetology currently appear to be adequately served by the private occupational training facilities of the community. However, should there be an increased demand for cosmetology courses, the college should be prepared to offer them.

VI. RECOMMENDED ADMINISTRATIVE ORGANIZATION
PIMA COUNTY COMMUNITY COLLEGE

The administrative organization recommended herein is planned for a full-time equivalent student enrollment of about five thousand. (When the college grows beyond this enrollment level, the administrative organization should be reappraised in terms of a single versus multi-campus plan.) The administrative organization proposed is designed to accommodate the community college program, which, along with a strong emphasis on counseling and guidance, will concern itself with occupational training, transfer curricula, and general education for part-time adults and regular full-time students. A carefully prepared administrative organization promotes open and free communication among line and staff officers of the administrative team.

The functions described for line officers answering directly to the President should be considered only as types of duties and not as an exhaustive list of operational tasks. The duties and responsibilities of third echelon officers are outlined in greater detail. Fourth echelon people assigned quasi-administrative duties are identified on the administrative chart and accounted for briefly in Section III of this chapter.

A. RATIONALE

Although practicalities of the local situation influence administrative organization and functions, any plan should be based upon a valid framework or system. A role concept--stemming from the behavioral sciences--underlies this proposal. Simply stated, this theory suggests that an administrator works within an inter-related group; his ultimate operational role is strongly influenced by the way others perceive his role. Translated into reality, the President's "modus operandi" is profoundly affected by the manner in which the Board of Trustees sees his role as chief administrative officer of the district.

Role theory provides a way of looking not only at administrative organization, but at operation as well. Detailed planning is required to guard the free flow of communication within an administrative team and to keep individual perceptions of duties and responsibilities in focus. Each line administrator must be aware of how his colleagues think and how other members of the team approach solutions to problems.

PIMA COUNTY JUNIOR COLLEGE

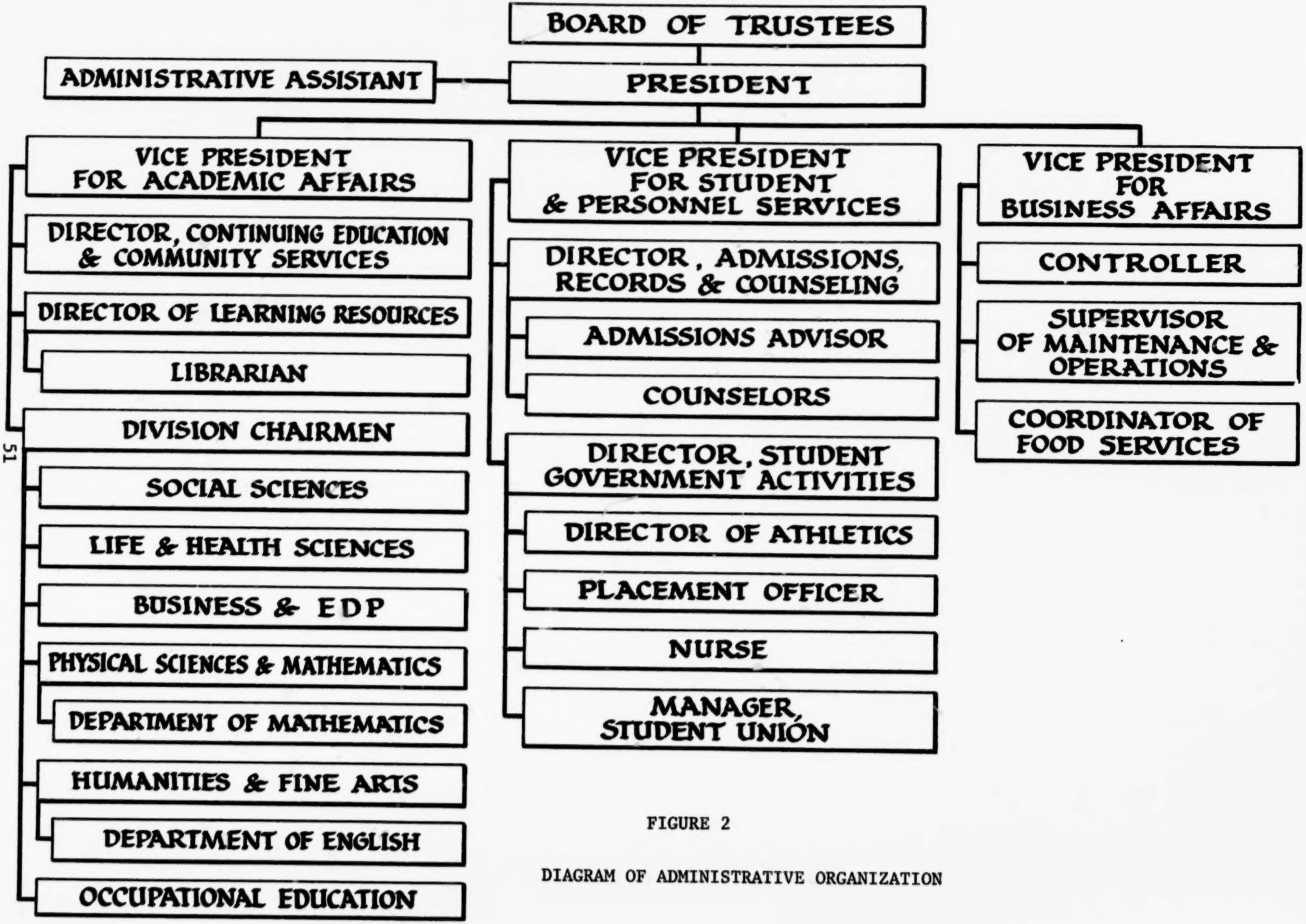
BOARD OF TRUSTEES
PRESIDENT
ADMINISTRATIVE ASSISTANT
VICE PRESIDENT FOR ACADEMIC AFFAIRS
DIRECTOR, CONTINUING EDUCATION & COMMUNITY SERVICES
DIRECTOR OF LEARNING RESOURCES
LIBRARIAN
DIVISION CHAIRMEN
SOCIAL SCIENCES
LIFE & HEALTH SCIENCES
BUSINESS & EDP
PHYSICAL SCIENCES & MATHEMATICS
DEPARTMENT OF MATHEMATICS
HUMANITIES & FINE ARTS
DEPARTMENT OF ENGLISH
OCCUPATIONAL EDUCATION
VICE PRESIDENT FOR STUDENT & PERSONNEL SERVICES
DIRECTOR, ADMISSIONS, RECORDS & COUNSELING
ADMISSIONS ADVISOR
COUNSELORS
DIRECTOR, STUDENT GOVERNMENT ACTIVITIES
DIRECTOR OF ATHLETICS
PLACEMENT OFFICER
NURSE
MANAGER, STUDENT UNIÓN
VICE PRESIDENT FOR BUSINESS AFFAIRS
CONTROLLER
SUPERVISOR OF MAINTENANCE & OPERATIONS
COORDINATOR OF FOOD SERVICES

FIGURE 2

DIAGRAM OF ADMINISTRATIVE ORGANIZATION

B. THE ADMINISTRATIVE FRAMEWORK

1. The President

The responsibilities and functions of the President are outlined in twelve basic statements. Because of his comprehensive responsibilities for the entire educational enterprise, some overlapping of functions will be noted. Types of functions are identified along with a detailed, but not exhaustive, list of carefully defined duties.

The President is the chief administrative officer of the district and is responsible directly to the Board of Trustees for the entire educational enterprise. He serves as liaison officer between the governing board, faculty, staff, and students and is in charge of developing and maintaining a climate conducive to optimum growth of the institution consistent with its mission. He is accountable for the total operation but should have authority to delegate responsibility as he sees fit. More specifically, the President is expected to:

1. Manage and direct all affairs of the college.
2. Develop a sound administrative structure for the college to insure that members of the faculty and staff will be properly assigned and supervised.
3. Prepare for approval of the Governing Board (with staff assistance) such rules and regulations as may be required for the operation of the college.
4. Approve policies and activities of groups and organizations functioning within the college.
5. Recruit and maintain (with staff assistance) instructional faculty and service staff to carry out the goals of the institute.
6. Exercise general control over all administrative, instructional, and service personnel.
7. Recommend to the Board of Trustees plans to finance the required capital and current budgets of the institution.
8. Give general direction to a program of instruction, research and community services suited to the needs of the communities served.

9. Supervise the development of the institution's building program.

10. Prepare an annual report (with staff assistance) describing and interpreting in some detail the current developments and future aspirations of the total enterprise.

11. Lend influence toward the development of enlightened local, state, regional and national educational philosophy and practice.

12. Provide for the preparation and submission of all reports required by local, state and national agencies.

The President should have authority to exercise all discretionary power necessary to insure the continuous, efficient operation of the college, including emergency appointment of personnel and authorization of expenditures to meet urgent and unexpected needs.

The President and his line officers, three Vice-Presidents whose duties are described below, constitute a Board of Control or Administrative Cabinet which should convene at regular weekly intervals to discuss problems in the context of broad policy. Members of the Administrative Cabinet may, if it appears appropriate, sit together as the general administrators of the college at meetings of the Board of Trustees.

2. The Vice President for Academic Affairs

The Vice President for Academic Affairs is responsible to the President for the total instructional curricula of the institution, i.e. day, evening, technical-vocational curricula, credit, and non-credit programs. He is expected to assist the President in the general administration of the college and, more specifically, to:

1. Interpret existing policies regarding instruction to the faculty and institute policy development and revisions.

2. Provide professional leadership in recruiting and developing the instructional staff of the college.

3. Recommend to the President the re-employment of faculty members and the need for employment of additional staff members.

4. Supervise instructors and provide leadership in the development, interpretation, and revision of the curriculum.

5. Maintain a system of faculty evaluations accompanied by suitable permanent reports.

6. Formulate policies for the scheduling of classes and assignment of instructors, and take responsibility for the development of the initial catalog and schedule of classes.

7. Serve as budget director for the instructional division.

8. Prepare and submit an annual budget for the instructional division.

9. Carry on a program of institutional research with the aid and cooperation of members of the instructional staff and the Vice President for Student Personnel Services.

10. Recommend priorities for future instructional facilities.

11. Cooperate in development of criteria and procedures for recruitment, admissions, registration, and testing and placement of students.

12. Prepare an annual report for the President.

The Vice President for Academic Affairs should be provided with a director in charge of continuing education and community services who, with the Vice President, is responsible for public information. Also reporting to the Vice President are the instructional division chairmen and the Director of Learning Resources. Specific duties are presented in a later section of this document.

3. The Vice President for Student Personnel Services

The Vice President for Student Personnel Services is responsible to the President for the entire Student Personnel Services program of the college, including counseling, admissions, activities, placement, testing, and health services. He is expected to assist the President in the general administration of the college and, more specifically, to:

1. Make recommendations to the President regarding plans, policies, and procedures for student personnel services.

2. Recommend to the President the employment of Student Personnel Services staff members.

3. Provide leadership and coordination for members of the Student Personnel Services division.

4. Carry on a program of in-service training for members of the Student Personnel Services division.

5. Maintain a system of evaluations accompanied by suitable records for members of the Student Personnel Services division.

6. Help Student Personnel Services staff members develop policies and procedures for student government and student organizations to be conducted with a minimum of counsel and supervision by college officials.

7. Develop criteria and procedures for recruitment, admission, registration, counseling, testing, and placement of students, in cooperation with the Vice President for Academic Affairs.

8. Carry on a program of institutional research with the aid and cooperation of members of the Student Personnel Services staff and the Vice President for Academic Affairs.

9. Through cooperative efforts with the Vice President for Academic Affairs develop materials for class schedules and the college catalogue.

10. Act as liaison officer between the college and high schools, senior colleges, and universities.

11. Serve as major budget director for the Student Personnel Services division.

12. Prepare and submit an annual budget for the division of Student Personnel Services.

13. Prepare an annual report for the President.

The Vice President for Student Personnel Services should have assistants in charge of admissions and records, counseling job placement, athletics, and student government. Specific duties are offered in a later section of this document.

4. The Vice President for Business Affairs

The Vice President for Business Affairs is responsible to the President for the business management of the college. He is expected to assist the President in the general administration of the institution and, more specifically, to:

1. Administer budget preparation and budget control.

2. Administer financial accounting and reporting and property accounting.

3. Administer disbursements and collections, and property purchasing and control.

4. Prepare contracts and maintain insurance contracts.
5. Administer all federal contracts.
6. Supervise property sales.
7. Assist the President in development of plant facilities, and supervise construction of facilities after contracts have been awarded.
8. Administer operation and maintenance of plant and facilities, including transportation.
9. Recommend to the President the employment of classified personnel.
10. Make arrangements for elections.
11. Serve as legal and financial consultant to the Administrative Cabinet and to the college committees.
12. Prepare an annual report for the President.

5. Staff Administrators: Vice President for Academic Affairs

According to the administrative chart, the following administrative officer is of the third echelon and is considered a staff administrator answerable directly to the Vice President for Academic Affairs.

a. Director of Continuing Education and Community Services

A Director should be appointed to coordinate, supervise, and schedule evening and summer school programs. Responsible directly to the Vice President for Academic Affairs, this staff officer would also be in charge of organizing a community services program which, in time, could be assigned to a third administrative officer. Among his duties are the following:

1. Coordinate and schedule evening and summer classes.
2. Recruit, recommend, and assign teaching personnel and special lecturers for evening and summer classes.
3. Supervise evening and summer classes and provide for the orientation and in-service education of evening teachers; coordinate the provision of texts, equipment, and other educational materials for these classes.

4. Coordinate the work of advisory committees established to assist in the development of the evening program.

5. Initiate a plan for a community services program--building on the evening adult program to encompass both credit and non-credit courses for the entire area.

6. Recommend to the Vice President for Academic Affairs improvements in course offerings, instructional methods, and materials.

7. Prepare the instructional budget for evening and summer classes.

8. Prepare informational materials and bulletins for evening and summer teachers.

9. Supervise the teaching of evening, summer, and community services faculties, record the time worked and submit to the business office the appropriate information for preparation of the payroll for such personnel.

10. Assist the Vice President for Academic Affairs in the preparation of public information materials, including news releases, radio scripts, and brochures.

11. Submit an annual report to the Vice President for Academic Affairs.

The Community Services responsibility of this Director, as suggested earlier, should be given priority attention as soon as a foundation of evening adult classes is established.

6. Staff Officers: Vice President for Student Personnel Services

According to the administrative chart, the following two administrative officers are of the third echelon and are considered staff officers answerable directly to the Vice President for Student Personnel Services:

a. Director of Admissions, Records and Counseling

The Director of Admissions should be appointed to coordinate and supervise the work of the Offices of Admissions and Records and Counseling. Responsible directly to the Vice President for Student Personnel Services, this staff officer may, according to his background and interests, actually act as Registrar or Head Counselor--maintaining coordinating and supervisory responsibilities over the other broad area explicit in his sub title. Among his duties are the following:

1. Make recommendations to the Vice President for Student Personnel Services regarding plans, policies, and procedures for student services.

2. Supervise the compiling of grade report lists for students relative to high school last attended and determine the grade point average (G.P.A.) of students by high school and entire campus and issue grade reports to high school principals.

3. Maintain the official up-to-date file of the permanent record of all students, including cumulative records and personnel folders.

4. Collect and maintain statistics on admissions, attendance, class enrollment, grades, graduates, and other statistical information regarding students pertinent to the college.

5. Supervise the distribution of grades to students, and the collection and filing of all instructor grade reports.

6. Certify that academic standards have been met by candidates for graduation and prepare a list of graduates.

7. Organize and direct registration of students.

8. Direct the issuance of transcripts for outgoing students.

9. Prepare appropriate lists of students such as probation, dismissal, honors, and special awards.

10. Organize and supervise the guidance program.

11. Develop a program of in-service training of the counseling staff.

12. Direct the testing programs, supervise the collection of guidance data, and prepare reports needed for the continuous evaluation and revision of the educational program.

13. Supervise the orientation program of all incoming students.

14. Direct student aid and scholarship programs.

15. Direct the counseling of students and processing of materials required by the Selective Services.

16. Supervise Veteran's Administration policies pertaining to students.

17. Prepare and submit an annual report to the Vice President for Student Personnel Services.

b. Director of Student Government and Activities

This position is needed to organize, coordinate, and supervise student government and student activities including supervision of the athletic program. Responsible directly to the Vice President for Student Personnel Services, this staff officer is expected to:

1. Plan, supervise, and coordinate all student activities including class organizations, clubs, student assemblies, athletic events, and social activites.
2. Recommend and supervise faculty advisors for student organizations.
3. Provide for preparation of the student handbook, student bulletins, handbooks for student officers and advisors, and student publications.
4. Serve as advisor to the executive board of the student body association.
5. Take responsibility for finances of the student body association.
6. Approve all contracts involving student body association funds.
7. Provide for the sale of tickets to any and all activities where any admission fee is charged.
8. Administer the student insurance program.
9. Maintain a master calendar for all social events.
10. Provide for student control on campus and at public functions where the college is officially represented.
11. Provide for supervision of all home athletic events, including crowd control; for student trips other than instruction, and for away-games when rooter buses are provided.
12. Provide for supervision of students at student government conferences.
13. Provide for supervision of equipment purchased by the student body association.
14. Make arrangements for use of off-campus facilities for college student events.
15. Provide for preparation of public information releases to newspapers and other media concerning student body activities.

16. Represent the college along with the Director of Intercollegiate Athletics at appropriate meetings.

17. Prepare an annual report for the Vice President for Student Personnel Services.

7. Administrative Assistant to the President

The position of Administrative Assistant to the President is best defined by the President himself. It is important that all understand that this is a staff position and not a line position.

The Administrative Assistant often serves as director of information services in addition to other responsibilities assigned by the President. Frequently this office is charged with reports and planning and often relates instructional and other needs to the President.

8. Assistants to the Vice President for Business

As indicated on the administrative chart, the Vice President for Business should be assigned three assistants, a Controller, a Supervisor of Maintenance and Operations, and a Coordinator of Food Services.

a. Controller

The Controller assists the Vice President for Business in the supervision of business functions of the college. Duties of his office include major work in:

1. Accounting and budget control
2. Collection and expenditure of funds
3. Financial and statistical reports
4. Purchasing
5. Supervision of inventory
6. Warehousing

b. Supervisor of Maintenance and Operation

The Supervisor of Maintenance and Operation assists the Vice President for Business in the supervision of business functions of the college with particular reference to:

1. Upkeep of buildings and equipment

2. Transportation

3. Facilities and grounds

c. Coordinator of Food Services

The Coordinator of Food Services assists the Vice President for Business in the supervision of business functions of the college with particular reference to operating the cafeteria and other food services areas. He reports to the Vice President for Business on the entire food services enterprise. Should the college elect to contract for food services, this position may not be needed.

9. Quasi-Administrative Officers

Other quasi-administrative officers appear on the administrative chart. The Director of Learning Resources is assisted by a Chief Librarian. The Learning Resources Director is responsible for the coordination of audio-visual programs and all other appropriate resources for learning. The Director is shown to answer directly to the Vice President for Academic Affairs. Increasing emphasis on making the college library a learning resources center strengthens the need for this direct relationship.

Several quasi-administrators report to the Vice President of Student Personnel Services: the Admissions Advisor, whose acquaintanceship with the college is broader than office personnel, and Counselors work under the Director of Admissions, Records and Counseling; and the Director of Athletics, Placement Officer, Nurse, and Student Store Manager work under the Director of Student Government.

As a final note to planning, institutional research and innovation, the responsibility for promoting, organizing and reporting research may be assigned to the staff position of Administrative Assistant, who reports directly to the President. The Administrative Assistant may supervise electronic data processing and additionally be responsible to the President for utilization studies of classroom facilities and such other related activities as assigned. Depending upon the experience and interest of the individual, he may devote much time to the direct planning of campus facilities. In such capacity he must work closely with the Superintendent of Buildings and Grounds.

C. DIVISION ORGANIZATION IS RECOMMENDED

Because the Pima County Community College will be a large college on a single site, a division form of organization is recommended. An alternative is to establish departments, but this is more effective for a small college than a large one. Divisions foster faculty concern with related disciplines, whereas departments tend to deal with problems of only one area.

Six divisions are recommended for the college, along with a department[1] of mathematics and a department of English and foreign languages. Department heads will report directly to the chairmen of physical science and humanities, respectively. The responsibilities of the division chairmen and the department heads are described below. The six instructional divisions are (1) Humanities and Fine Arts, (2) Physical Sciences and Mathematics, (3) Social Sciences, (4) Business and Electronic Data Processing, (5) Life and Health Sciences and (6) Occupational Education.

1. Division Chairmen

The primary administrative task of the division chairmen is (1) to coordinate and facilitate the instructional activities within the division and (2) to counsel and make recommendations to the college administration concerning instructional problems and activities. Initially chairmen are to be appointed. Thereafter the faculty may wish to elect them. The selection of division chairmen is based on experience and excellence in teaching, educational background and training, leadership, cooperation, judgment, and other personality characteristics.

Specific responsibilities of the division chairmen include:

1. Consulting with the administration concerning curriculum and instructional problems.
2. Aiding in preparing and submitting academic budgets.
3. Advising with faculty members concerning coordinating and improving instruction.
4. Preparing evaluations of teachers. Assisting new teachers in informal orientation activities.
5. Recommending teachers for replacements or additions to the teaching staff.

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[1] The two departments do not violate the principle discussed in the above paragraph. The departments are necessary due to the number of teachers engaged in teaching mathematics and English.

The most important function of the college is teaching. All activities and planning should contribute to the improvement of this over-all purpose. Division chairmen and department heads should be excellent teachers who may assist students and colleagues in the instructional tasks, while providing leadership which contributes to harmonious instructional relationships.

2. The Department Heads

The two department heads should be elected by the faculty on the basis of their teaching, experience, training, and leadership qualities. They are expected to carry a teaching load in addition to coordinating department activities. Their specific responsibilities include:

1. Counseling with students and conferring with the division chairmen and Dean of Faculty concerning academic and departmental problems.

2. Preparation of the departmental academic budget and its submission to the administration through the Division Chairman.

3. Requisitioning supplies, materials, and services when needed to implement and facilitate the work of the department.

4. Assisting the preparation of teacher evaluations, where appropriate.

5. Studying the teaching needs of the department and consulting with the Division Chairman concerning teaching needs and problems.

No department head has the authority to designate the teaching load for individual instructors. That is the job of the Vice President for Academic Affairs.

Through him the Division Chairman determines what each teacher's work load and other responsibilities shall be. Non-teaching assignments which affect the work load of faculty members are likewise assigned by the Vice President for Academic Affairs.

3. The Instructional Divisions

HUMANITIES AND FINE ARTS

Art
Drama
Journalism
Music
Philosophy
Photography
Speech

DEPARTMENT OF ENGLISH AND FOREIGN LANGUAGES

PHYSICAL SCIENCES AND MATHEMATICS

Chemistry
Earth Science
Electronics
Engineering
Physics

DEPARTMENT OF MATHEMATICS

SOCIAL SCIENCES

Anthropology
Economics
Education
History
Political Science
Psychology
Sociology

BUSINESS AND ELECTRONIC DATA PROCESSING

Accounting
Business Law
Data Processing
General Business
Secretarial
Shorthand
Typing

LIFE AND HEALTH SCIENCES

Anatomy
Biology
Botany
Home Economics
Microbiology
Physical Education
Zoology

OCCUPATIONAL EDUCATION

Automotive Repair Technology
Automotive Technologies
Electronics, Electrical, and Mechanical Technologies
Graphic Arts Technologies
Hotel, Motel, Food and Beverage Services
Motion Picture Technology
Para Medical Services
Protective Services (Police, Fire, and Security)
Retail and Sales Services

VII. PIMA COUNTY COMMUNITY COLLEGE ENROLLMENT FORECAST

The enrollment forecasts for the Pima County Community College as reported in the "Study of Community College Possibilities" were summarized on page 190 of that report and the table is reproduced below:

TABLE 4

COMMUNITY COLLEGE ENROLLMENT PROSPECTS[1]
(FULL-TIME EQUATED)

	Liberal		Conservative	
Year	(a) 15% Grades 9-12 2% Annual Increase to 25%	(b) 10% Grades 9-12 2% Annual Increase to 20%	(a) 10% Grades 9-12 1.6 % Annual Increase to 18%	(b) 5% Grades 9-12 2% Annual Increase to 15%
1968-69	3,698	2,465	2,465	1,232
1969-70	4,346	3,067	2,965	1,789
1970-71	5,009	3,690	3,480	2,372
1971-72	5,704	4,346	4,020	2,988
1972-73	6,431	5,033	4,585	3,635
1973-74	7,189	5,752	5,176	4,314
1974-75	7,389	5,911	5,320	4,434
1975-76	7,588	6,071	5,464	4,553
1976-77	7,856	6,285	5,657	4,714
1977-78	8,124	6,500	5,850	4,875
1978-79	8,395	6,716	6,044	5,037
1979-80	8,661	6,929	6,236	5,197
	*(12,372)	*(9,898)	*(8,908)	*(7,424)

*Estimated head count on the assumption full-time enrollments would equate out at approximately 70 per cent.

Both of the conservative forecasts are based upon the assumptions that smaller percents of enrollments grades 9-12 would be reflected in community college enrollments. If the full-time equated enrollments equated out at about 70 percent of head count, then as shown in the parentheses, the numbers of different individuals that might reasonably be expected to enroll in a public community college might run as high as 12,372. In terms of previous experience, and in the judgment of the survey director, the actual enrollment which might be expected to develop is most likely to fall between the conservative "a" forecast and the liberal "b" prediction. Full-time equated enrollments might reasonably be expected to fall between 6,200 and 6,900 by the year 1979-80 with a corresponding head count of between 8,900 and 9,900 individuals. Projected enrollments of this magnitude would seem to make consideration of a second campus within the next ten to fifteen years necessary as part of the long-range planning program.

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[1] "A Study of Community College Possibilities in Pima County, Arizona," Table 87, p. 190.

* * *

It is impractical to plan facilities only large enough for the immediate occupancy upon completion of construction, especially where the facility is of a highly specialized nature and expensive to duplicate. Community college projects should therefore be designed for the number of occupants expected several years after the completed construction. For these reasons, the concensus of the governing board and the Arthur D. Little, Inc. study team was to establish the educational specifications at three levels: 2,800, 3,500 and 6,000. The specifications provided at these three levels enable the governing board and the architects to achieve a degree of flexibility so important to good facility planning.

VIII. EDUCATIONAL SPECIFICATIONS

The proposed development program for the Pima County Community College has been derived from the educational philosophy and mission of the college as set forth by the college board, published data, the basic guidelines as set forth in this study and the use of special consultants.

A. PLANNING GUIDELINES AS DETERMINED BY THE EDUCATIONAL PHILOSOPHY

Pima College will be a comprehensive community college with an "open-door" policy, providing integrated occupational and academic counseling and faculty advising services. The college will provide occupational, continuing education, general education, and transfer programs. The college will endeavor to provide community service facilities including cultural and recreational programs and activities in the later stages of its development after community support for these kinds of facilities has been assessed.

To establish guidelines for planning the future college facilities, the following specific items of approach to instructional philosophy, operational policies, and special programs and services to be provided were discussed with and approved by the college board.

1. Instructional Philosophy

Many kinds of instructional spaces are to be provided for the future faculty. These spaces should be adaptable for the use of a variety of instructional techniques and should accommodate a variety of class sizes. Each instructor, or group of instructors, should be able to determine his own teaching methods and techniques. Therefore, the facilities should provide for the broad spectrum of teaching methods used in contemporary education. These will include individual study, project and seminar groups, medium and large group instruction, team teaching, and multidiscipline and multiclass teaching. Provision should be made for audiovisual media (including closed-circuit television) as well as programmed instruction (including, ultimately, some provision for the future use of computerized instruction; see Appendix B).

There is, however, to be no single commitment to any one of these teaching methods or techniques. Therefore, the assortment of teaching spaces should be balanced. Specialized laboratories for technical curricula typically found in community colleges should be included where the possibility of such programs exists. However, atypical, highly specialized, unique, and costly laboratory facilities should not be included in the program at this time. It is assumed that arrangements can be made with local industry through cooperative training programs for the occasional use of their specialized facilities when necessary

2. Operational Policies

(a) Initially, the college is to be a single campus operation. However, as the college develops its programs, acquires staff and faculty, and monitors its growth in enrollment during the first two levels of enrollment, a multi-campus operation will be considered by the future college president and the board. The present facilities program for the three enrollment levels should accomodate sufficient lead time for the determination of the necessity for a multi-campus operation.

(b) The administrative organization and division structure is similar to that recommended in Section VI of this report.

(c) The college will operate under a semester system. The facilities have been calculated on the basis of the day program and a 45-hour instructional week. It is recommended, however, that the college operate continuously from 7 a.m. to 10 p.m. and that no distinction be made between the day and evening programs.

3. Special Services and Programs

(a) Because of the large enrollments projected in the third enrollment level, an attempt should be made to preserve the identity of the individual student and yet nurture both large group and small group interaction between faculcy and students. Wherever possible the architects should consider this factor in the physical planning and in the design character of the campus.

In an attempt to solve the above problem and encourage student-faculty interaction at all levels of campus life, and also to provide the commuting student with study areas in addition to those provided in the learning resources center, the following facilities are recommended. These facilities should be dispersed throughout the campus and related to the divisional structure and should be organized as small, single operational units:

1. Fountain and vending machine eating facilities

2. Individual study stations. A portion of the American

Library Association (ALA) recommended standard for reader stations has been distributed to the Division units for individual study.

3. Division and/or department offices, faculty offices and conference-seminar rooms.

4. Student lockers.

(b) The college union is to be a multipurpose facility for the use of both the student body and the community. It should function as a central meeting place for the students. Space on the site plan should be provided adjacent to it for a possible future motel which would be used to accomodate instructional space for the hotel-motel program and as a conference center. It should accomodate an instructional program for restaurant administration and the culinary arts, house the student bookstore, provide for indoor recreation and house the student government and publications offices.

(c) The student counseling center should be available, on a limited basis, as a guidance center for the community to assist adults and other students in identifying educational needs and goals.

(d) The college library should be a comprehensive learning resources center with both library and audiovisual services.

(e) A multipurpose trial laboratory for occupational programs will be provided for experimentation and trial testing of specialized occupational programs. This facility will be used to forestall premature construction of specialized facilities before the programs have been tested or become established. It is recommended that the programs for air conditioning and refrigeration and aeronautics be housed in this facility in the first phase. The welding and machine shop programs could be housed in these facilities prior to constructing special facilities for them in the later enrollment levels, after the determination of whether or not the air conditioning and aeronautics programs have been sufficiently successful to build specialized facilities.

B. METHODOLOGY USED IN CALCULATING THE COLLEGE FACILITIES

1. The Problem

The technique and criteria used to determine the instructional facility requirements for Pima Community College were evolved to cope with the unique problem of programming a new college which:

(a) Has had no previous history or experience to draw upon;

(b) Is without benefit of faculty;

(c) Has only a Board;

(d) Must prepare a basic facility development program for the architects in an extremely short period of time; and

(e) Must do this without a planning staff and when the Board and its committees are facing the other pressing problems of creating a new college, acquiring a president, staff and faculty.

Solving the problem adequately within the above limitations requires a consideration of:

(a) The expected growth of the college over the years, with some expectation of the ultimate size and character of the campus to enable the architect to anticipate and allow for future needs.

(b) A generalized or model curriculum which is specific enough for the establishment of the facility requirements but which leaves the specific course content open for continuous development by the faculty and administrative staff. This process of continuous change and development of specific course content will continue throughout the life of the college.

(c) A method of proportioning and subdividing the enrollments, converted into weekly student contact hours, among the generalized curriculum to produce the basic educational spaces.

(d) Review and modification of the generalized curriculum, where appropriate, on the basis of the specific findings of the study of community college possibilities in Pima County, the perusal of additional studies and reports, and the group discussions with the local representatives of business, industry and the professions.

(e) The projected facility requirements for this generalized curriculum on the basis of accepted standards of utilization, and a knowledge of utilization in other comparable facilities.

The procedure that has been used in calculating the instructional facility requirements for the Pima College includes the following:

(a) On the basis of the enrollment forecasts for Pima College contained in the "Study of Community College Possibilities," we have established three enrollment levels for the college to the year 1980. Each of these enrollment levels assumes an FTE (full-time equivalent) enrollment for the day program. The number of FTE students is determined by dividing the total credit hours enrolled in the day program by 15.

(b) A conversion factor of 19 weekly student hours per FTE student was used to determine the total weekly student hours for each enrollment level.

(c) A percentage distribution pattern was developed for the generalized curriculum for each enrollment level.

(d) The minimum utilization of the instructional facilities was assumed to be 22.4 hours per week average station period use for classrooms and 21.3 hours per week average station period use for laboratories. The instructional facilities were calculated for each enrollment level at this assumed average station utilization.

(e) Class size assumptions, teacher-student factors for major curriculum areas were based on mean class sizes for all California junior colleges, 1963. WSH/FTE teacher for each curriculum area was determined by an assumed teacher load of 16 hours/week x the mean class size. Large group instruction was determined primarily by Social Science General Humanities curriculum areas. See Table 5 for mean class sizes, California junior colleges, 1963. Classrooms and laboratories were sized to allow for an average occupancy of at least 66% and 85% respectively.

(f) A computer was used to calculate the basic instructional facility requirement for the three enrollment levels. The Administration Center, Learning Resources Center, College Union, Physical Education, and other service facilities were calculated using the standards and assumptions indicated in Section VIII C of this report.

TABLE 5

MEAN CLASS SIZE AND VARIATION IN CLASS SIZE
ALL CALIFORNIA JUNIOR COLLEGES, 1963

CURRICULUM AREA	CLASSROOM		LABORATORY	
	Class Size	Variation	Class Size	Variation
Biological Science	46.37	17.16	24.62	3.63
Mathematical Science	29.61	4.36	19.02	9.86
Physical Science	37.82	10.44	20.90	3.69
Social Science General	30.23	8.59	17.56	0
Anthropology-Archeology	45.13	22.60	16.13	15.56
Economics	39.02	7.74	21.00	0
Geography	34.70	7.48	21.37	18.43
History	44.68	11.11	28.67	0
Political Science	42.54	11.54	18.28	6.45
Psychology	42.03	10.66	21.88	6.08
Sociology	42.51	10.06	26.00	0
Other Social Sciences	31.00	0	0	0
Humanities General	49.79	27.61	0	0
Art	49.22	46.51	18.78	4.44
Drama	19.24	7.68	14.99	8.90
English	29.50	3.32	28.62	17.26
Foreign Language General	23.79	4.23	22.09	7.03
Music	24.94	9.15	23.80	10.78
Philosophy	37.42	9.75	0	0
Speech	23.39	5.39	11.76	8.71
Other Humanities	24.17	4.12	0	0
Physical Education	48.42	39.03	30.44	4.40
Agriculture General	21.03	8.06	15.24	5.62
Business General	30.82	5.68	26.61	5.85
Home Economics	28.64	19.60	16.96	6.16
Applied Graphic Art	13.35	5.16	11.51	5.27

TABLE 5 (Cont'd)

CURRICULUM AREA	CLASSROOM Class Size	CLASSROOM Variation	LABORATORY Class Size	LABORATORY Variation
Health Service General	22.90	7.97	18.79	9.40
Public Personal Service, General	27.76	9.59	24.08	19.02
Aeronautical Technology	19.02	10.16	17.48	6.20
Air Conditioning	13.66	7.57	17.71	5.31
Building Trades	21.71	14.99	15.32	9.41
Culinary	12.66	3.76	14.95	5.56
Drafting Technology	16.61	9.89	17.69	5.66
Electrical Technology	21.88	11.54	15.22	7.12
Electronics Technology	20.81	7.97	16.22	3.89
Engineering General	22.44	9.16	18.62	5.07
Engineering Technology	19.07	11.86	12.41	6.18
Industrial Management Supervision	19.62	8.82	0	0
Mechanical	17.20	6.33	14.15	5.61

TABLE 6

FTE STUDENT -FACULTY RATIOS

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
FTE Student Adjusted Faculty Ratio	21	20	20

The student faculty ratios developed for the three Pima College enrollment levels are indicated in Table 6 above. These ratios are a result of a separate calculation for teacher requirements in each curriculum area using WSCH/FTE teacher ratios as described in (e) above and in Section VIII B (4) of this report.

2. The Enrollment Levels and Utilization Assumptions

The enrollment levels were established from enrollment forecasts in Table 4 of this report. Three enrollment levels for the day program were selected on the basis of enrollment forecasts between the liberal (b) and the conservative (a) estimates. The day program was assumed to be 80% of the total enrollments listed. The projected day program enrollment for the year 1970-1971 was 2800 FTE students. The years 1971-1973 were forecast at 3500 FTE day students, while enrollment for the years 1980-1983 was forecast at 6000 FTE day students.

In accordance with our contract, only two enrollment levels were originally calculated. However, after preliminary cost estimates by the architects, an additional enrollment level of 2800 FTE day students was calculated in an attempt to reduce capital investment costs in the first phases of construction. The final enrollment level of 5265 FTE day students for the year 1979-1980 was increased to 6000 FTE day students on the basis of an estimated student accommodation to the year 1983, or under the assumption that the enrollment projections could slide toward the liberal (a) forecast.

These enrollment levels are not to be interpreted as building or construction phases. The construction phases are properly the role of the architect and involve detailed considerations of facility phasing and temporary and interim multipurpose use of buildings as determined by structural modules and construction cost. The facility program given for each enrollment level can be phased, added to, or subtracted from, as actual college needs change over the years.

The minimum utilization assumptions of 22.4 hours for classrooms and 21.3 hours for laboratories should allow sufficient instructional space to meet problems in scheduling, peak loads, unpredictable variations in room period use and class size.

The utilization standards assume a classroom period use of 34 hours per week with an average station occupancy of 66% and a laboratory period-use of 25 hours per week with an 85% average station occupancy. The product of room period-use and average station occupancy is the average station period-use of 22.4 hours per week and 21.3 hours per week, respectively.

The Coordinating Council for Higher Education, State of California, conducted a statewide utilization study of higher educational facilities in 1963. At that time the 72 California junior colleges developed the following statistics for permanent facilities:

a. Classrooms	21.5 hours per week room period use 67.4% average station occupancy 14.5 hours per week station period use
b. Laboratories	22.7 hours per week room period use 65.2% average station occupancy 14.8 hours per week average station period use

If the Master Plan minimum utilization standards of 1963 are taken as 100% occupancy on a capacity scale, 16 of the junior colleges developed capacities above 100%, ranging from 100 to 135%. Only two colleges developed capacities above 150%. The median capacity developed was just above 81%. (See Figure 5)

New standards which were adopted for California junior colleges by the State Board of Education in December, 1966, have been increased as follows:

a. Classrooms	34 hours per week room period use 66% average station occupancy 22.4 average station period use
b. Laboratories	25 hours per week room period use 85% average station occupancy 21.2 average station period use

These new utilization standards for California junior colleges were used to calculate station requirements for Pima College.

In projecting the facilities for a new college it is important to allow for elasticity in the utilization assumptions. We have assumed that these standards for each enrollment level are achievable. The future staff and faculty of the college are cautioned to avoid developing course proliferation and small class sizes with consequent high room period uses for a given enrollment level, otherwise scheduling difficulties will be experienced. The average station period use reflects a balance between room period use and station occupancy. At a given enrollment level, as the average class size decreases and the number of courses increases, the room period use decreases and scheduling becomes more difficult. Therefore, the assumption of a high utilization standard in the programming of instructional spaces for a given enrollment level restricts the number of possible courses in each curriculum area. This increases the difficulty of scheduling and shortens the lead time for further construction phases .

It is our practice to use a lower utilization standard for sizing the facilities where the capital budgeting of college facilities is not as restricted as it is in the case of Pima College. This practice allows a minimum and a maximum enrollment for a given enrollment level. The resulting projected facilities will accommodate development of a larger number of courses with smaller enrollments at the beginning of each enrollment level. As the enrollment in these new courses increases, the maximum enrollment for that level will be achieved with approximately the same room-period use and curriculum comprehensiveness. This procedure also allows for unexpected increases in enrollment and will more reasonably extend the lead time for determining the need for additional facilities.

3. The Educational Program Used to Project Facility Requirements

The educational program used to project Pima College facilities consists of comprehensive curriculum areas that are both typical of community colleges and unique to Pima County and which Pima College will more than likely undertake. It does not define the actual courses or course content which make up a curriculum area. For purposes of projecting a college space program the curriculum areas are subdivided by subject matter as determined by facility requirements.

The curriculum distribution pattern which was used to project facility requirements for Pima College was developed after an analysis of the employment characteristics of Pima County residents and comparable California counties. This procedure has been explained in Section III (c) (1) of this report, The Analog Method. As a result of this analysis comprehensive community colleges which have been operating for some years in comparable employment milieus were selected to structure the preliminary curriculum distribution pattern.

The curriculum patterns of these colleges were compared and the patterns of Chaffey and San Bernardino Community Colleges were selected and averaged. The resulting curriculum distribution pattern was used as the first prototype for the Pima College distribution pattern. Comparisons were then made of the mean curriculum distribution pattern for all California junior colleges, weighted to all colleges over 1000 FTE students, and the fraction of California junior colleges offering that curriculum area. Comparisons were then made with the curriculum areas identified in the local surveys, the occupational offerings in other Arizona junior colleges, the percent of Pima County students in other Arizona junior colleges, and the extent of parental interest in certain mid-level manpower occupational education curricula for their children. See Table 7. Additions and/or deletions were made to the preliminary distribution pattern on the basis of this analysis.

As a result of this analysis the facilities for each of three enrollment levels were calculated from a different curriculum distribution pattern for each enrollment level. The table describing the curriculum patterns includes the station demand and FTE instructor requirements. See Tables 8 through 10.

TABLE 7

COMPARISON OF SELECTED JUNIOR COLLEGE CURRICULUM DISTRIBUTION PATTERNS AND RESULTS OF LOCAL STUDIES FOR THE OCCUPATIONAL TECHNICAL CURRICULUM

1 COLLEGE	2 COMPARISON OF COUNTY MEAN DIFF. SQUARED	3 FTE (8-5)	4 TOTAL WSH (8-5)	4A TOTAL HEAD COUNT (8-10)	5 AGRIC GEN	6 BUS GEN	7 INDUS TEC	8 EDUC	9 HOME EC	10 GR ARTS	11 HLTH SERV	12 PUB PERS SERV	13 AERO TECH	14 DRAFT TEC	15 ELEC TECH	16 ELECTRO	17 ENGR GEN	18 ENGR TECH	19 MECH & AUTO	20 WELDING	21 METAL TEC	22 ARCHITEC	23 BLDG TRADES	24 OPTICAL	25 REFRIG AIR CON	26 CULINARY ART	27 OLD TUCSON	28 TOTAL JC CATEGORIES
Marin	1.98	1757	31,328	2702		11.95		.17	1.06	1.99	4.32			.19		.83	1.86		1.08	.08		1.77	.65					25.30
Allen Hancock	1.67	1342	18,481	2397		9.87		.67	.55	.54		.37		.32		3.33	1.74	.88	2.09	.58								21.60
Santa Barbara	1.67	1397	24,078	2012		7.44				.70	3.99			.25		1.48	.93		1.18									15.97
Barstow	2.64	155	2031	1099		7.14											11.23											18.37
Chaffey	2.64	1968	38,733	4521		10.06			.90	1.32	5.53	.62	2.17	2.25		1.68	.88	.58		.23								26.23
San Bernardino	2.64	3559	60,490	8933	.43	7.68			2.02	.13	.84	.72	1.01	1.96	.46	2.71	.19	.25	1.16	.15								19.72
Average % for All Calif. JC's, weighted to Colleges Over 1000 FTE					1.69	9.49		.16	1.12	1.60	3.69	2.35	1.34	1.54	.79	2.07	1.60	.56	1.99	.63		.70	.93		.83	1.77		
% of Calif. JC's Offering This Curriculum Area					.35	1.00		.49	.79	1.00	.86	.87	.46	.83	.39	.71	.95	.45	.83	.51		.12	.60		.21	.13		
Curriculum Areas Identified In Local Surveys					*	*					*	*	*		*	*			*					*	*	*	*	
% of Pima College Students In Other JC's in Arizona in These Curriculum Areas					5.35	31.23	4.46			2.67	4.45	14.28		10.71		3.57			22.31		.89							100.0
Occupational Offerings In Arizona JC's					*	*	*	*	*	*	*	*	*	*		*	*	*	*		*					*		
Extent of Parental Interest In Mid-Level Manpower Occupational Education for Their Child [a]					*	*			*		*			*		*		*	*			*			*			

a. Page 127, Table 72, "Community College Possibilities in Pima County, Arizona," by Arizona State Board & Pima County JC Planning & Development Committee.

TABLE 8

ENROLLMENT LEVEL ONE

CURRICULUM DISTRIBUTION - WEEKLY STUDENT HOURS AND STATIONS REQUIRED AT GIVEN UTILIZATION ASSUMPTION

	% WSH		WSH		Station Required			Adjusted
Subject	CR	LAB	CR	LAB	CR	LAB	FTE Instructor	FTE Instructor
Life Science								
Biology	1.43	1.79	761	951	34.0	44.6	2.9	3.5
Anatomy & Physiology	.32	.39	171	209	7.6	9.8	.6	.8
Microbiology	.86	.93	456	494	20.4	23.2	1.6	1.9
Zoology	.32	.39	171	209	7.6	9.8	.6	.8
Botany	.32	.39	171	209	7.6	9.8	.6	.8
Life Science - Subtotal	3.25	3.90	1730	2072	77.2	97.3	6.4	7.7
Mathematics	8.80		4681		209.0		9.8	11.7
Physical Science								
Physics	1.39	1.14	740	605	33.0	28.4	3.5	4.2
Chemistry	3.25	2.65	1727	1412	77.1	66.3	7.3	8.7
Earth Sciences	.71	.58	377	307	16.8	14.4	1.6	1.9
Physical Science - Subtotal	14.14	4.37	7524	2324	335.9	109.1	22.1	26.5

TABLE 8 (continued)

ENROLLMENT LEVEL ONE

Subject	% WSH CR	% WSH LAB	WSH CR	WSH LAB	Station Required CR	Station Required LAB	FTE Instructor	Adjusted FTE Instructor
Social Science								
Anthropology	.45		239		10.7		.4	.4
Economics	.97		518		23.1		.9	1.0
Geography	.43	.01	227	5	10.1	.2	.5	.5
History	4.22		2247		100.3		3.3	4.0
Political Science	2.86		1521		67.9		2.4	2.9
Psychology	3.64		1937		86.5		3.0	3.5
Sociology	1.82		968		43.2		1.4	1.7
Social Science - Subtotal	14.39	.01	7656	5	341.8	.2	11.8	14.1
Humanities								
Art	.98	1.91	523	1016	23.3	47.7	3.8	4.6
Drama	.25	.07	133	39	6.0	1.8	.6	.7
English	10.51		5591		249.6		12.0	14.5
Foreign Languages	2.98	.31	1583	163	70.7	7.6	4.4	5.2
Music	1.27	.92	673	488	30.1	22.9	3.0	3.6
Philosophy	.71		379		16.9		.6	.8
Speech	1.84	.02	980	10	43.7	.5	2.6	3.1
Humanities - Subtotal	18.54	3.23	9862	1716	440.3	80.6	27.1	32.5

TABLE 8 (continued)

ENROLLMENT LEVEL ONE

Subject	% WSH CR	% WSH LAB	WSH CR	WSH LAB	Station Required CR	Station Required LAB	FTE Instructor	Adjusted FTE Instructor
Graphic Arts								
General	.02		10		.4		.0	.1
Commercial	.07	.19	38	104	1.7	4.9	.4	.5
Photograph	.06	.17	29	88	1.3	4.1	.4	.5
Journalism	.05	.14	27	74	1.2	3.5	.5	.6
Other	.01		4		.2		.0	.0
Business								
General	.29		157		7.0		.3	.3
Accounting & Bookkeeping	.72	.52	383	279	17.1	13.1	1.3	1.6
Finance	.82		435		19.4		.7	.8
Data Processing	.31	.20	164	109	7.3	5.1	.7	.8
Management	1.18		627		28.0		1.1	1.3
Typing		2.18		1162		54.6	2.1	2.6
Shorthand		1.40		744		34.9	1.4	1.6
Marketing	.46		244		10.9		.5	.6
Adding Machines		.64		342		16.1	.6	.8
Health Science								
Registered Nursing	.34	.79	181	422	8.1	19.8	2.5	3.0
Vocational Nursing	.50	1.17	268	624	12.0	29.3	2.4	2.9
Dental	.20	.46	105	245	4.7	11.5	1.0	1.2
Medical Assistance	.06	.14	32	75	1.4	3.5	.3	.4
Inhalation Therapy	.00	.01	1	4	.1	.2	.0	.0

TABLE 8 (continued)

ENROLLMENT LEVEL ONE

Subject	% WSH CR	% WSH LAB	WSH CR	WSH LAB	Station Required CR	Station Required LAB	FTE Instructor	Adjusted FTE Instructor
Public & Personal Services								
Home Economics	.90	.55	479	291	21.4	13.7	2.3	2.8
Nursing Education	.03		15		.7		.1	.1
Police	.61		323		14.4		.7	.9
Recreation Leader	.01		6		.3		.0	.0
Welfare Aid	.01		8		.4		.0	.0
Occupational Education								
Aeronautics Technology	.30	1.26	161	669	7.2	31.4	2.4	2.8
Air Conditioning	.19	.78	103	413	4.6	19.4	1.4	1.7
Drafting Technology	.20	1.87	108	997	4.8	46.8	3.1	3.8
Electrical Technology	.15	.09	77	45	3.4	2.1	.3	.4
Electronics Technology	.83	1.34	443	712	19.8	33.4	3.8	4.6
Engineering-General	.19	.33	100	178	4.4	8.4	.9	1.0
Engineering-Technical	.14	.27	73	144	3.2	6.7	.8	1.0
Auto Shop	.11	.48	56	253	2.5	11.9	1.0	1.2
Welding	.15	.58	77	310	3.5	14.5	1.3	1.6
Hotel-Restaurant	.26	.81	139	429	6.2	20.1	2.0	2.4
Subtotal	9.17	16.38	4876	8712	217.7	409.0	36.4	43.7
Physical Education	2.22	10.42	1180	5541	52.7	260.1	8.8	10.6
Total	61.71	38.29	32829	20371	1465.6	956.4	112.6	135.2

TABLE 9

ENROLLMENT LEVEL TWO

CURRICULUM DISTRIBUTION - WEEKLY STUDENT HOURS AND STATIONS REQUIRED AT GIVEN UTILIZATION ASSUMPTION

Subject	% WSH CR	% WSH LAB	WSH CR	WSH LAB	Station Required CR	Station Required LAB	FTE Instructor	Adjusted FTE Instructor
Life Science								
Biology	1.36	1.70	905	1131	40.4	53.1	3.4	4.1
Anatomy & Physiology	.31	.37	204	249	9.1	11.7	.8	.9
Microbiology	.82	.88	543	588	24.2	27.6	1.9	2.3
Zoology	.31	.37	204	249	9.1	11.7	.8	.9
Botany	.31	.37	204	249	9.1	11.7	.8	.9
Life Science - Subtotal	3.09	3.71	2058	2465	91.9	115.7	7.6	9.2
Mathematics	8.37		5567		248.5		11.6	13.9
Physical Science								
Physics	1.32	1.08	880	720	39.3	33.8	4.2	5.0
Chemistry	3.09	2.53	2054	1680	91.7	78.9	8.6	10.4
Earth Sciences	.67	.55	448	365	20.0	17.1	1.9	2.3
Physical Science - Subtotal	13.46	4.16	8950	2765	399.6	129.8	26.3	31.6

TABLE 9 (continued)

ENROLLMENT LEVEL TWO

Subject	% WSH CR	% WSH LAB	WSH CR	WSH LAB	Station Required CR	Station Required LAB	FTE Instructor	Adjusted FTE Instructor
Social Science								
Anthropology	.43		284		12.7		.4	.5
Economics	.93		616		27.5		1.0	1.2
Geography	.41	.01	270	6	12.0	.3	.5	.6
History	4.02		2673		119.3		4.0	4.8
Political Science	2.72		1809		80.7		2.8	3.4
Psychology	3.46		2304		102.9		3.5	4.2
Sociology	1.73		1151		51.4		1.7	2.1
Social Science - Subtotal	13.69	.01	9107	6	406.6	.3	14.0	16.8
Humanities								
Art	.93	1.82	622	1208	27.7	56.7	4.6	5.5
Drama	.24	.07	159	47	7.1	2.2	.7	.8
English	10.00		6650		296.9		14.3	17.2
Foreign Languages	2.83	.29	1883	193	84.0	9.1	5.2	6.2
Music	1.20	.87	801	580	35.7	27.3	3.6	4.3
Philosophy	.68		451		20.1		.8	.9
Speech	1.75	.02	1166	13	52.0	.5	3.1	3.7
Humanities - Subtotal	17.64	3.07	11730	2041	523.7	95.8	32.2	38.6

TABLE 9 (continued)

ENROLLMENT LEVEL TWO

Subject	% WSH		WSH		Station Required		FTE Instructor	Adjusted FTE Instructor
	CR	LAB	CR	LAB	CR	LAB		
Graphic Arts								
General	.02		12		.5		.1	.1
Commercial	.07	.19	46	125	2.1	5.9	.5	.6
Photography	.05	.16	35	106	1.6	5.0	.5	.6
Journalism	.05	.13	33	89	1.5	4.2	.6	.7
Business								
General	.28		186		8.3		.3	.4
Accounting & Bookkeeping	.69	.50	456	332	20.3	15.6	1.5	1.8
Finance	.78		517		23.1		.8	1.0
Data Processing	.29	.19	195	129	8.7	6.1	.8	.9
Management	1.12		746		33.3		1.3	1.5
Typing		2.08		1382		64.9	2.5	3.0
Shorthand		1.33		885		41.5	1.6	2.0
Marketing	.44		291		13.0		.6	.8
Adding Machines		.61		407		19.1	.7	.9
Health Science								
Registered Nursing	.35	.83	236	550	10.5	25.8	3.3	3.9
Vocational Nursing	.53	1.23	349	815	15.6	38.2	3.2	3.8
Dental	.21	.48	137	320	6.1	15.0	1.4	1.6
Medical Assistance	.06	.15	42	98	1.9	4.6	.4	.5

TABLE 9 (continued)

ENROLLMENT LEVEL TWO

Subject	% WSH CR	% WSH LAB	WSH CR	WSH LAB	Station Required CR	Station Required LAB	FTE Instructor	Adjusted FTE Instructor
Inhalation Therapy	.00	.01	2	5	.1	.2	.0	.0
Sanitation	.01		6		.3		.0	.0
Hospital Technician	.01	.01	4	10	.2	.5	.0	.0
Personal & Public Services								
Home Economics	.86	.52	570	346	25.5	16.2	2.7	3.3
Police	.60		402		17.9		.9	1.1
Recreation Leader	.01		7		.3		.0	.0
Welfare Aid	.01		10		.4		.0	.0
Occupational Education								
Aeronautics Technology	.32	1.39	215	921	9.6	43.3	3.2	3.9
Agriculture								
Ornamental Horticulture	.67	.75	445	497	19.9	23.3	3.3	3.9
Landscape Architecture	.13	.30	85	201	3.8	9.4	.9	1.1
Air Conditioning	.23	.92	154	614	6.9	28.8	2.1	2.5
Drafting Technology	.19	1.78	129	1186	5.8	55.7	3.7	4.5
Electrical Technology	.14	.08	92	54	4.1	2.5	.4	.5
Electronics Technology	.79	1.27	527	847	23.5	39.8	4.5	5.4
Engineering-General	.18	.32	119	212	5.3	9.9	1.0	1.2
Engineering-Technical	.13	.26	86	171	3.9	8.0	.9	1.1
Auto Shop	.35	1.59	234	1055	10.5	49.5	4.2	5.1
Welding	.13	.52	86	344	3.8	16.1	1.5	1.8
Hotel-Restaurant	.46	1.39	307	921	13.7	43.3	4.3	5.1
Subtotal	10.17	18.98	6762	12622	301.9	592.6	54.0	64.8

TABLE 9 (continued)

ENROLLMENT LEVEL TWO

Subject	% WSH CR	% WSH LAB	WSH CR	WSH LAB	Station Required CR	Station Required LAB	FTE Instructor	Adjusted FTE Instructor
Physical Education	2.11	9.91	1403	6591	62.6	309.4	10.5	12.6
Total	60.17	39.83	40010	26490	1786.2	1243.7	144.6	173.5

TABLE 10

ENROLLMENT LEVEL THREE

CURRICULUM DISTRIBUTION - WEEKLY STUDENT HOURS AND STATIONS REQUIRED AT GIVEN UTILIZATION ASSUMPTION

	% WSH		WSH		Station Required			Adjusted
Subject	CR	LAB	CR	LAB	CR	LAB	FTE Instructor	FTE Instructor
Life Science								
Biology	1.30	1.63	1487	1859	66.4	87.3	5.7	6.8
Anatomy & Physiology	.29	.36	335	409	14.9	19.2	1.3	1.5
Microbiology	.78	.85	892	967	39.8	45.4	3.1	3.8
Zoology	.29	.36	335	409	14.9	19.2	1.3	1.5
Botany	.29	.36	335	409	14.9	19.2	1.3	1.5
Life Science - Subtotal	2.97	3.56	3384	4053	151.1	190.3	12.6	15.1
Mathematics	8.03		9154		408.7		19.1	22.9
Physical Sciences								
Physics	1.22	1.00	1392	1139	62.1	53.5	6.6	7.9
Chemistry	2.85	2.33	3249	2657	145.1	124.8	13.7	16.4
Earth Science	.62	.51	709	577	31.6	27.1	3.0	3.6
Astronomy	.19	.15	214	170	9.5	8.0	.7	.8
Physical Science - Subtotal	12.91	3.99	14718	4543	657.0	213.3	43.0	51.6

TABLE 10 (continued)

ENROLLMENT LEVEL THREE

Subject	% WSH CR	% WSH LAB	WSH CR	WSH LAB	Station Required CR	Station Required LAB	FTE Instructor	Adjusted FTE Instructor
Social Science								
Anthropology	.41		468		20.9		.7	.8
Economics	.89		1013		45.2		1.7	2.0
Geography	.39	.01	444	10	19.8	.5	.9	1.1
History	3.85		4394		196.2		6.5	7.8
Political Science	2.61		2974		132.8		4.6	5.6
Psychology	3.32		3788		169.1		5.8	6.9
Sociology	1.66		1893		84.5		2.8	3.4
Social Science - Subtotal	13.13	.01	14973	10	568.4	.5	23.0	27.6
Humanities								
Art	.90	1.74	1022	1986	45.6	93.3	7.5	9.0
Drama	.23	.07	261	77	11.6	3.6	1.1	1.3
English	9.59		10934		488.1		23.6	28.3
Foreign Languages	2.72	.28	3095	318	138.2	14.9	8.5	10.2
Music	1.15	.84	1317	954	58.8	44.8	5.9	7.1
Philosophy	.65		741		33.1		1.3	1.5
Speech	1.68	.01	1916	21	85.6	1.0	5.0	6.1
Humanities - Subtotal	16.92	2.94	19286	3356	861.0	157.6	52.9	63.5

TABLE 10 (continued)

ENROLLMENT LEVEL THREE

Subject	% WSH CR	% WSH LAB	WSH CR	WSH LAB	Station Required CR	Station Required LAB	FTE Instructor	Adjusted FTE Instructor
Graphic Arts								
General	.01		16		.7		.1	.1
Commercial	.05	.15	61	166	2.7	7.8	.6	.7
Photograph	.04	.12	47	142	2.1	6.6	.7	.8
Publishing & Printing	.12		139		6.2		.5	.7
Journalism	.04	.10	44	119	2.0	5.6	.8	.9
Business								
General	.27		306		13.7		.6	.7
Accounting & Bookkeeping	.66	.48	749	545	33.4	25.6	2.5	3.0
Finance	.75		851		38.0		1.4	1.6
Data Processing	.28	.19	320	213	14.3	10.0	1.3	1.5
Management	1.08		1227		54.8		2.1	2.5
Typing		1.99		2272		106.7	4.2	5.0
Shorthand		1.28		1454		68.3	2.7	3.2
Marketing	.42		478		21.3		1.0	1.2
Adding Machines		.59		669		31.4	1.2	1.5
Health Sciences								
Registered Nursing	.42	.98	481	1121	21.5	52.6	6.7	8.0
Vocational Nursing	.62	1.46	711	1659	31.8	77.9	6.4	7.7
Dental	.24	.57	279	651	12.4	30.6	2.8	3.3

TABLE 10 (continued)

ENROLLMENT LEVEL THREE

Subject	% WSH CR	% WSH LAB	WSH CR	WSH LAB	Station Required CR	Station Required LAB	FTE Instructor	Adjusted FTE Instructor
Health Sciences (continued)								
Medical Assistant	.07	.18	85	200	3.8	9.4	.8	1.0
Sanitation	.01		12		.5		.0	.0
Hospital Technician	.01	.02	8	20	.4	.9	.1	.1
Inhalation Therapy	.00	.01	4	10	.2	.5	.0	.0
Personal & Public Service								
Home Economics	.82	.50	939	565	41.9	26.5	4.5	5.4
Fire Sciences	.13		149		6.6		.3	.3
Nursery Education	.02		21		.9		.1	.1
Police	.41	.82	468	936	20.9	43.9	3.1	3.8
Recreation Leader	.01		11		.5		.0	.0
Welfare Aid	.01		11		.5		.0	.0
Occupational Education								
Aeronautics Technology	.28	1.15	314	1307	14.0	61.4	4.6	5.5
Air Conditioning	.22	.89	252	1010	11.3	47.4	3.4	4.1
Building Trades	.22	.89	252	1010	11.3	47.4	3.9	4.7
Drafting Technology	.19	1.71	212	1950	9.5	91.5	6.1	7.4
Electrical Technology	.13	.08	151	91	6.8	4.3	.7	.8
Electronics Technology	.76	1.22	867	1393	38.7	65.4	7.4	8.9
Machine Shop	.04	.20	46	227	2.0	10.7	.9	1.1
Auto Shop	.48	.96	545	1091	24.3	51.2	5.4	6.5

TABLE 10 (continued)

ENROLLMENT LEVEL THREE

Subject	% WSH		WSH		Station Required		FTE Instructor	Adjusted FTE Instructor
	CR	LAB	CR	LAB	CR	LAB		
Occupational Education - (continued)								
Diesel	.12	.60	136	682	6.1	32.0	2.7	3.2
Welding	.03	.14	31	164	1.4	7.7	.7	.8
Optics	.27	.53	303	606	13.5	28.4	2.3	2.7
Hotel-Restaurant	.44	1.33	505	1515	22.5	71.1	7.0	8.4
Agriculture								
Ornamental Horticulture	.42	.47	481	536	21.5	25.2	3.5	4.2
Landscape Architecture	.08	.19	92	217	4.1	10.2	1.0	1.2
Engineering	.10	.20	115	232	5.1	10.9	1.4	1.7
Other	.10	.20	115	232	5.1	10.9	.9	1.1
Engineering General	.17	.31	195	348	8.7	16.4	1.7	2.0
Engineering Technology	.12	.25	142	281	6.3	13.2	1.6	1.9
Movie	.21	.43	242	485	10.8	22.8	2.3	2.7
Subtotal	10.89	21.16	12415	24118	554.2	1132.3	102.1	122.5
Physical Education	2.02	9.51	2307	10836	103.0	508.7	17.2	20.7
Total	58.84	41.16	67083	46917	2994.8	2202.7	250.8	301.0

4. Method of Calculating Facility Requirements

a. Instructional Facilities

The number of student stations required at each enrollment level for the assumed utilization to be developed by the college was calculated as follows:

$$\frac{\text{Total FTE Enrollment x 19 WSH/FTE x \% WSH by Subject}}{\text{Assumed Room Period-Use x Assumed Station Occupancy}} = \text{Student Stations Required}$$

For classrooms the calculation would be:

$$\frac{\text{1 Weekly Student Hour}}{\text{34 hours per week x 66\% occupancy}} = \text{1/22.4 Station/WSH}$$

For laboratories the calculation would be:

$$\frac{\text{1 Weekly Student Hour}}{\text{25 hours per week x 85\% occupancy}} = \text{1/21.3 Station/WSH}$$

The student station demand was calculated separately for classrooms and laboratories and the number of instructional rooms was determined by dividing total station demand by the station allotment per room. If fewer stations were demanded than the station per room standard specified and if the instructional space was specialized and not capable of multipurpose use, a room was assigned. It's utilization will be below the assumed average for the college for the given enrollment level. Room requirements were rounded [illegible] than one room was required, and rooms capable of multipurpose use were developed by combining station demands from the relevant curriculum areas.

The net assignable square footage for each classroom and laboratory was determined by multiplying the allotted stations per room by the space standard for that room type. These space standards in Section VIII C 4 are defined in the basic facility program and listed in Section VIII C 4.

Estimates of the number of head-count students in each subject matter area can be made by the following calculation:

$$\frac{\text{Weekly Student Hours for the Subject Matter area}}{\text{WSH/Student}} = \text{Estimated head-count students}$$

The estimated number of classes or sections can be determined by the following calculation:

$$\frac{\text{Estimated Head Count Students}}{\text{Mean Class Size}} = \text{Estimated Number of Classes or Sections}$$

The procedure used for calculating the instructional facility requirements is diagrammed in Figure

The FTE teacher requirements by subject matter area were calculated as follows:

$$\frac{\text{Weekly Student Hour/Enrollment Level}}{\text{FTE Teacher Per Weekly Student Hour}} = \text{FTE teachers required}$$

$$\text{FTE teachers x factor} = \text{estimated FTE instructional staff required}^{1}$$

The FTE teacher/WSH factors were obtained from the California Co-ordinating Council for Higher Education Utilization Study of 1963 as was the factor which increased FTE teacher requirements to instructional staff requirements. This factor increased the basic teacher requirements to allow for such additional teacher duties as academic advising and student services.

The academic office requirements were calculated using the following assumptions:

1. The space for divisional administrative staff has been [illegible] in addition to the instructional staff.
2. Instructional staff includes teacher time requirements for other than classroom teaching (i.e., academic advising and student service).
3. One academic office was provided for each FTE instructional staff required. Eighty assignable square feet were allowed to each academic office. This space standard has been followed by California junior colleges as a planning guideline. Analysis of the 1963 inventory of permanent facilities, indicates that existing practice has provided an average of 80.4 feet/station.

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[1] The instructional staff requirement includes time spent by teachers for academic advising, participation in student activities, etc.

b. Other College Facility Requirements

The other college facilities including the Administration Center, Registration and Admissions, Counseling, Learning Resources Center, Physical Education Facilities, College Union, and Maintenance, Garage, and Warehouse facilities were calculated using planning standards and assumptions as indicated in Section VIII C 4 of this report, or as indicated in the facility program.

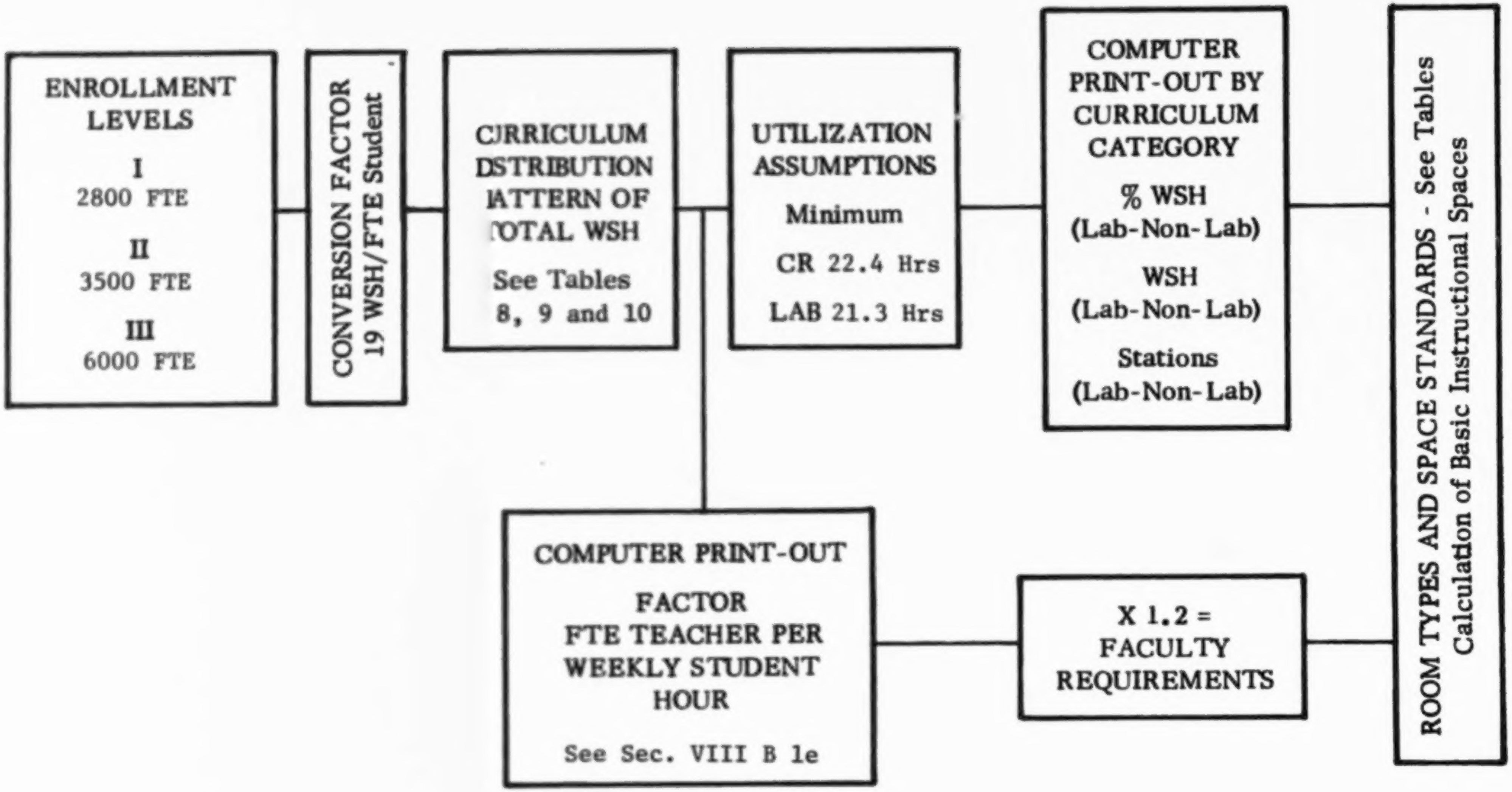

ENROLLMENT LEVELS
I 2800 FTE
II 3500 FTE
III 6000 FTE
CONVERSION FACTOR 19 WSH/FTE Student
CURRICULUM DISTRIBUTION PATTERN OF TOTAL WSH
See Tables 8, 9 and 10
UTILIZATION ASSUMPTIONS
Minimum
CR 22.4 Hrs
LAB 21.3 Hrs
COMPUTER PRINT-OUT BY CURRICULUM CATEGORY
% WSH (Lab-Non-Lab)
WSH (Lab-Non-Lab)
Stations (Lab-Non-Lab)
ROOM TYPES AND SPACE STANDARDS - See Tables
Calculation of Basic Instructional Spaces
COMPUTER PRINT-OUT
FACTOR
FTE TEACHER PER WEEKLY STUDENT HOUR
See Sec. VIII B 1e
X 1.2 =
FACULTY REQUIREMENTS

FIGURE 3 PROCDURE USED FOR CALCULATING PIMA COLLEGE INSTRUCTIONAL SPACES

C. THE FACILITY PROGRAM

1. Summary of Facility Requirements for Pima College

The net and estimated gross area for instructional space and total campus space for the proposed Pima College campus are summarized in Tables 11 and 12, respectively. Table 13 tabulates the estimated parking requirements and Table 14 summarizes the outdoor areas.

The area per FTE student for various categories, including net and gross square footages for the instructional spaces and total campus spaces are summarized in Table 15. A comparison of the total net area per FTE student developed for the Pima College program with all California junior colleges for the year 1963 indicates that the Pima College space program is below the median for all three enrollment levels. See Figure 4.

A comparison of the distribution of space in the Pima College facilities program with the mean distribution of space in all California junior colleges for 1963 is summarized in Table 16.

The instructional space is 6% below the mean of 50% in the first enrollment level and 5% below the mean for the second and third enrollment levels. As additional occupational programs are developed from the second enrollment level on, it can be expected that the percentage of instructional space will equal or exceed the California mean of 50%.

The percentage of office space is 4% higher in the first enrollment level, 1% higher in the second and 1% lower in the third enrollment level.

The percentage of library space is 7% higher than the California mean in the first enrollment level, 6% in the second and 4% higher in the third enrollment level. This additional square footage in the Pima College library can be accounted for by the concept in Pima of a comprehensive learning resources center and the inclusion of the audiovisual facilities in the library category in the Pima College facility program. Many of the older California junior college libraries are not comprehensive learning resource centers. Also, the audiovisual General and TV spaces are included under "other" in the California statistics.

The lower percentage square feet for the category "other" in the first phase of the Pima program, 5% lower than the mean for California junior colleges, is primarily due to the reduced program in the college union, the exclusion of the gymnasium and reduced garage, warehouse and maintenance space, due to the necessity of reducing capital costs in the first phase of development.

TABLE 11

SUMMARY OF INSTRUCTIONAL SPACE

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Large Group Instruction	5990	10,130	12,005
Physical Sciences	8290	11,800	15,510
Mathematics	3570	5665	8640
Life Sciences	7580	9540	14,840
Health Sciences	4103	5423	8202
Science Classroom Area	4700	7100	8600
Social Sciences	-	-	-
Business	7190	11,510	13,410
Data Processing	-	600	600
Humanities	2380	2965	4760
Language Lab	750	750	750
Music	4740	8500	8860
Fine & Applied Arts	5110	8690	14,580
English	5040	6230	10,080
Personal & Public Services	2300	3490	6975
Engineering Technologies	8580	14,530	51,630
Aeronautics	-	-	13,000
Welding	-	-	7500
Machine Shop	-	-	7000
Multi Purpose Tech Lab	6250	6250	6250
Air Cond. & Refr.	-	5000	10,000
Auto Shop	5000	5000	5000
Distributed Study Carrels	3500	4375	7500
Physical Educ Classrooms	720	1440	2160
Culinary Arts Program	11,420	13,170	15,610
Little Theater (seating)	-	4050	4050
INSTRUCTIONAL TOTAL NET ASSIGNABLE SQ.FT.	97,213	146,208	257,512
% OF TOTAL NET ASSIGNABLE SQ.FT.	44%	45%	45%

TABLE 12

SUMMARY OF AREAS FOR COLLEGE FACILITIES

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Administration	8110	9060	9705
Admissions & Registration	6335	6335	6435
Counseling	2744	3169	4543
E.D.P.	-	-	6755
Warehouse, Garage & Maintenance	8210	13,620	16,910
Learning Resources Center			
Library	19,285	25,505	37,055
Audio-Visual	9580	15,752	20,744
Administrative	390	390	390
Physical Sciences & Mathematics	17,165	23,660	32,900
Life & Health Sciences	15,788	19,953	26,602
Math, Physical, Life & Health Sciences Classroom Area	4700	7100	8600
Social Science	3685	4375	6160
Humanities	6075	7360	10,990
Music	5392	9152	10,331
Fine & Applied Arts	6281	10,350	17,085
English	6935	8374	13,220
Occupational Education	3410	4100	7285
Personal & Public Services	2300	3490	6975
Engineering & Technology	19,830	30,780	100,380
Business and EDP	10,310	15,730	19,020
Large Group Instruction	5990	10,130	12,005
Physical Education			
Gymnasium	19,294	21,721	90,140
Outdoor Athletics	(515,000)*	(525,000)*	(912,820)*

*Not included in Total

TABLE 12 (Cont'd)

SUMMARY OF AREAS FOR COLLEGE FACILITIES (Cont'd)

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
College Union (Outdoor Area)	38,520 (11,740)*	62,935 (18,900)*	87,715 (27,020)*
Little Theatre	-	13,130	13,130
TOTAL NET ASSIGNABLE SQ.FT.	220,329	326,135	568,025
ESTIMATED GROSS SQ.FT. (at 1.5 x Net)	330,494	489,203	852,038

* Not included in Total

TABLE 13

ESTIMATED PARKING REQUIREMENTS

		Sq. Ft. at Enrollment Level		
	Ratio	I	II	III
Staff	1	(81) 32,400	(104) 41,600	(151) 60,400
Faculty	1	(135) 54,000	(174) 69,600	(301)120,400
Students (Head Count)	.5	(3360)672,000	(4200)840,000	(7200)1,440,000
Guests	-	(40) 16,000	(50) 20,000	(100) 40,000
Total Sq. Ft.		774,400	971,200	1,660,800
Total Acres		18	21	38

TABLE 14

SUMMARY OF OUTDOOR AREAS

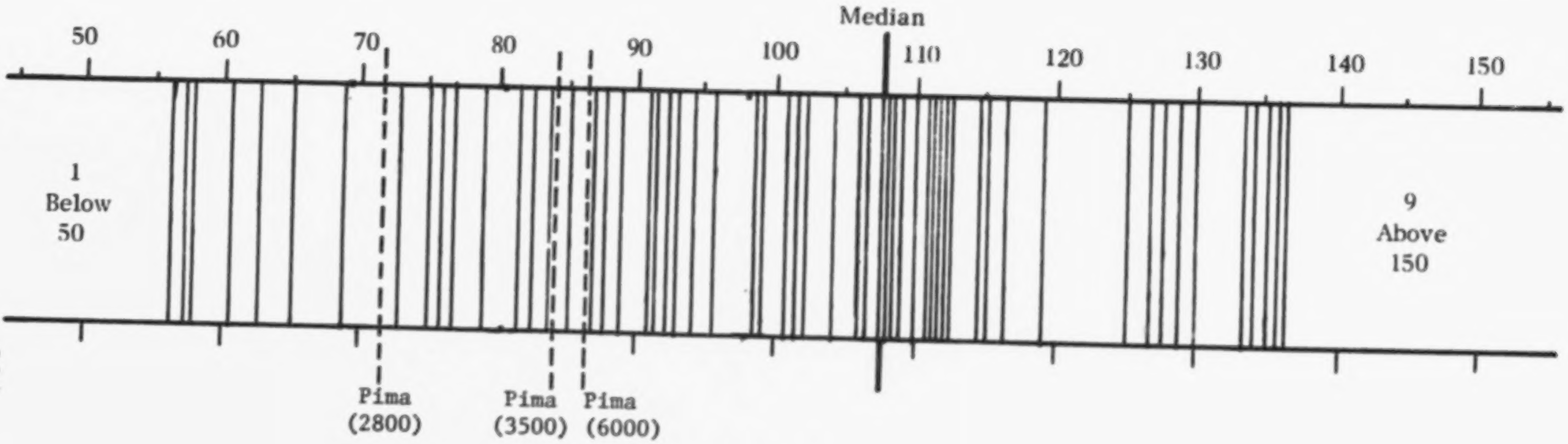
	Sq. Ft. at Enrollment Level		
	I	II	III
Physical Education	515,000	525,000	912,820
Maintenance	8000	10,000	10,000
Parking	774,400	971,200	1,660,800
Outdoor Sculpture	-	-	800
College Union	11,740	18,900	27,020
Total Sq. Ft.	1,309,140	1,525,100	2,611,440
Total Acres	30	35	60

TABLE 15

SUMMARY OF AREA/FTE BY ENROLLMENT LEVEL

PIMA COLLEGE FACILITIES PROGRAM

Category	Enrollment Level I 2800 Students	Enrollment Level II 3500 Students	Enrollment Level III 6000 Students
Instructional Space			
Net Sq. Ft./FTE	35	42	43
Gross Sq. Ft./FTE	53	63	65
Total Space			
Net Sq. Ft./FTE	79	93	95
Gross Sq. Ft./FTE	119	140	143



1. Full time students as defined for California Colleges in the continuum above = All students taking twelve or more units of credit. Net square footages are adjusted to full time students by taking 90% of Pima College totals.

2. From Determining Student Capacity in Existing Physical Facilities in California Junior Colleges, California CCHE.

FIGURE 4 THE LOCATION OF EACH CALIFORNIA JUNIOR COLLEGE ON A CONTINUUM ACCORDING TO TOTAL NET ASSIGNABLE SQUARE FEET PER FULL TIME STUDENT, FALL 1963

TABLE 16

COMPARISON OF THE DISTRIBUTION OF SPACE BY CATEGORY BETWEEN ALL CALIFORNIA JUNIOR COLLEGES-1963 AND PIMA COLLEGE SPACE PROGRAM

	Mean All California Junior Colleges 1963	PIMA COLLEGE		
		I	II	III
INSTRUCTION	50%	44%	45%	45%
OFFICE[a]	11%	15%	12%	10%
LIBRARY & MUSEUM[b]	6%	13%	12%	10%
OTHER	33%	28%	31%	35%

a. Office space includes the Administrative Center complete, administrative and staff offices including secretary, files and storage, faculty offices, workrooms and student administrative offices in the College Union.

b. Library space includes the Learning Resources Center complete except for administrative and staff offices.

2. Capacity Analysis of the Pima College Facilities Related to Enrollment Forecasts

We used the new and higher recommended utilization standards for California junior colleges for programming instructional space and for making capacity calculations. These standards are as follows:

	Classrooms		Laboratories	
	Room Period Use 8 - 5	Station Occupancy	Room Period Use 8 - 5	Station Occupancy
Utilization Standards	34 hrs/wk	66%	25 hrs/wk	85%

Six calculations of capacity were made as follows; a conservative and liberal estimate of enrollment for each of the three enrollment levels. The formula used for determining capacity in terms of weekly student contact hours was as follows:

1. Classrooms: 34 hours x 66% x No of Sta. = Capacity in WSCH

   Laboratories: 25 hours x 85% x No of Sta. = Capacity in WSCH

2. Lab WSCH + Classroom WSCH = 100% capacity at the utilization level used to project facilities

3. $\frac{\text{Estimated WSCH for Enrollment Period}}{\text{WSCH Capacity at Utilization Standard}} = \%$ of Fullness

Table 17 summarizes the capacity calculations for each year from 1968 through 1980. The capacities for the last year of each enrollment level, i.e. 1970-71, 1975-76, and 1979-80, have been placed on a scale of capacities developed by California junior colleges in 1963 for comparative purposes. The capacities developed by the California junior colleges are based on the older master plan utilization standards of 18 hours average station period use for classrooms and 16 hours average station period use for laboratories. The approximate number of stations included in the Pima College program are summarized in Table 18.

If a comparable standard would have been used to project the Pima College facilities, the space program would have provided an approximate

TABLE 17

CAPACITY ANALYSIS OF PIMA COLLEGE FACILITIES PROGRAM RELATED TO ENROLLMENT FORECASTS

		LIBERAL (a) ENROLLMENT FORECAST			LIBERAL (b) AND CONSERVATIVE (a) ENROLLMENT FORECAST		
		EST WSCH	WSCH AT ASSUMED UTILIZATION	ESTIMATED CAPACITY	EST WSCH	WSCH AT ASSUMED UTILIZATION	ESTIMATED CAPACITY
2800	1968-69	56,202	45,759	122.82	37,468	45,759	81.88
	1969-70	66,044	"	139.95	45,847	"	100.19
	1970-71	76,133	"	166.37	54,492	"	119.08
3500	1971-72	86,697	71,607	121.07	63,574	71,607	88.78
	1972-73	97,755	"	136.51	73,093	"	102.07
	1973-74	109,269	"	152.59	83,049	"	115.97
	1974-75	112,309	"	156.84	85,348	"	117.79
	1975-76	115,330	"	161.05	87,647	"	122.40
6000	1976-77	119,415	102,741	116.22	90,744	102,741	88.32
	1977-78	123,481	"	120.18	93,860	"	91.35
	1978-79	127,604	"	124.19	96,976	"	94.38
	1979-80	131,651	"	128.13	100,035	"	97.36

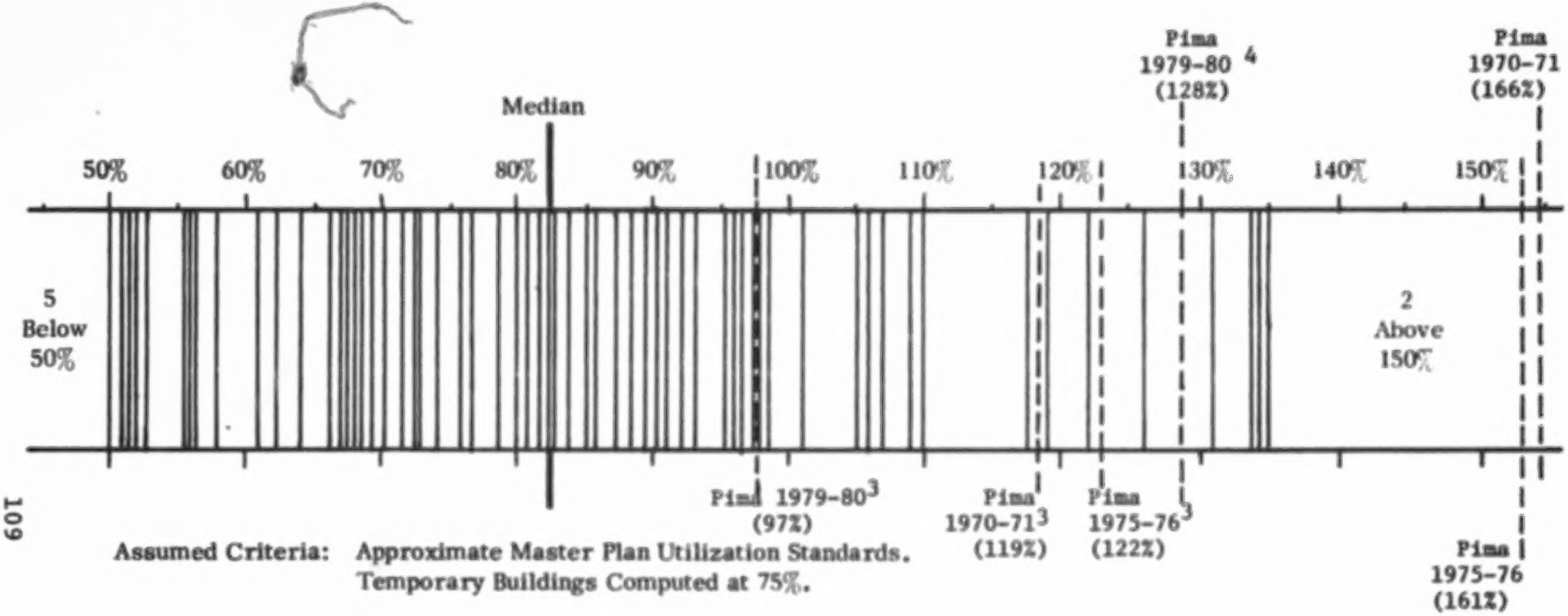
increase of 24% in classroom stations and 33% in laboratory stations. Taking this original master plan minimum standard as a measure of 100% capacity and recalculating the capacities indicated in Table 17 would have produced capacity ratings identical to those calculated for the higher utilization standard used to project Pima College facilities and the resulting higher measure for 100% capacity. This, of course, merely reflects that the utilization standard used to project the facilities and to measure 100% capacity are internally consistent.

The other variables which affect the capacity calculations are the ratio of weekly student contact hours to full time equivalent students and the actual enrollments which will occur as opposed to the estimated enrollments.

In 1963 the mean ratio of weekly student hours per full time equivalent student for all California junior colleges for the day program was 17.21 weekly student hours per full time equivalent student. The range was 8.74 to 30.72 weekly student hours per full time equivalent student. Generally, as the number of laboratory courses increases in the college the WSCH/FTE student ratio increases. A ratio of 19 WSCH/FTE students was used to convert estimated FTE student enrollments to estimated WSCH hours for planning Pima College facilities because of the emphasis on occupational education which will consume more laboratory hours. The two college distribution patterns used as a preliminary pattern for Pima College had the following WSCH/FTE ratios: Chaffey, 19.68 and San Bernardino, 17.00.

The other variable which affects the capacity calculations will be the actual enrollments experienced by Pima College. The scale of capacity ratings in Figure 5 measures the actual enrollments for the given number of stations at the older master plan minimum standards of 18 hrs/wk and 16 hrs/wk for California junior colleges in 1963.

The major conclusion to be drawn from the comparison of the estimated capacity for Pima College and the actual capacities developed by California junior colleges in 1963 is that if the conservative enrollment estimates are developed by Pima College, the college will be more than meeting its target utilization of plant, which will be greater than that achieved by California junior colleges measured by a lower utilization standard. However, if the liberal enrollment estimates obtain, the college will be required to accelerate its capital investment program, especially in the first phases of its development. It will have to do this within the context of a very tight space program, a very efficient scheduling procedure and with an emphasis on a fewer number of courses with a relatively high class enrollment in each course.



Assumed Criteria: Approximate Master Plan Utilization Standards. Temporary Buildings Computed at 75%.

1. Each vertical line represents the location of a junior college on the scale.

2. From Determining Student Capacity in Existing Physical Facilities in California Junior Colleges, California CCHE.

3. Liberal (b) and conservative (a) enrollment forecast.

4. Liberal (a) enrollment forecast.

FIGURE 5 THE LOCATION OF EACH CALIFORNIA JUNIOR COLLEGE ON CAPACITY SCALE 50% TO 150% CAPACITY, FALL 1963[1,2] COMPARED WITH FACILITIES PROGRAM DEVELOPED FOR PIMA COLLEGE UNDER VARIOUS ENROLLMENT FORECASTS.[3,4]

TABLE 18

SUMMARY OF INSTRUCTIONAL STATIONS INCLUDED IN THE PIMA COLLEGE FACILITIES PROGRAM

STATIONS:	I		II		III	
	CR	LAB	CR	LAB	CR	LAB
EDP (Computer Room)						12
Language Lab		30		30		30
Physical Sci						
Physics Lab		24		48		48
Chem Lab		48		72		96
Earth Sci Lab		30		30		30
(Note: Planetarium excluded)						
Math	210		245		420	
Life & Health Sci						
Bio Lab		72		72		120
Anat. & Physiol		24		24		24
Zoo Lab				24		24
Botany						24
Nursing		20		20	45	20
Med Assistant Lab				24		24
Dental Assistant Lab		24		24		48
General Classroom	45		45		90	
Science Large Group Instruction	200		300		400	
Social Science			-		-	
Large Group Instruction -						
Soc Sci & Humanities	250		500		675	
Humanities & Fine Arts	140		175		280	
Music Theory	40		40		40	
Choral Group				100		100
Instrument Rehearsal		100		100		100

TABLE 18 (Cont'd)

STATIONS:	I		II		III	
	CR	LAB	CR	LAB	CR	LAB
Music Appreciation			100		100	
Fine & Applied Arts						
Painting Studios		50		50		75
Gen Art Lab		25		25		25
Graphics				10		10
Ceramics				25		25
Photog.						20
Weaving						10
Sculpture						20
Classroom	45		90		135	
Occupational Education						
Personal & Public Services						
Home Econ		25		25		50
Poli Sci	30		30		30	25
Classroom			70		105	
Engineering Technologies						
Drafting		50		75		125
Surveying		25		25		25
Electronics		25		50		75
Optics						25
Classroom	45	1	90		135	
Welding						25
Machine Shop						25
Air Conditioning				25		50
Multipurpose Lab		50		50		50
Auto		25		25		25
Diesel						25
Agriculture						25
Hotel-Restaurant Admin		25		25		25

TABLE 18 (Cont'd)

STATIONS:	I		II		III	
	CR	LAB	CR	LAB	CR	LAB
Classroom	45		45		90	
Business & EDP						
Typing Lab		80		80		120
Shorthand		35		35		70
Accounting				40		40
Adding Machine		45		45		45
Office Procedures		30		30		30
Data Proc.				15		15
Marketing		40		40		40
Classrooms	90		175		175	
Physical Ed (Excludes Gymnasium & Fields)						
Classrooms	45		90		135	
TOTAL	1185	902	1995	1263	2855	1820

Note: Excludes Little Theatre

3. The Facility Program for Pima College

(a.) Definition of Net Assignable Square Footage

Unless otherwise indicated, all square footages shown in Tables 19 through 35 are net assignable square feet. The net assignable square foot is commonly defined as usable interior area and does not include corridors, lobby areas, toilets, janitors' closets, utility closets, mechanical areas, structural or wall thicknesses, overhangs, covered walks, etc. These spaces are to be provided by the architect in the course of his development of the schematic design. The net area as a percentage of the gross area for the college campus will vary with the functional requirements of different geographical areas and the actual architectural design of the campus.

TABLE 19
DIVISION OF PHYSICAL SCIENCES & MATHEMATICS

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Division Center			
1. Division Chairman's Office	150	150	150
a. Secretary & Reception	125	125	125
b. Filing & Storage	55	55	55
2. Department of Mathematics Chairman's Office	120	120	120
a. Secretary & Reception	105	105	105
b. Files & Storage	50	50	50
3. Physical Sciences Chairman's Office	120	120	120
a. Secretary & Reception	105	105	105
b. Files & Storage	50	50	50
4. Faculty Offices	(27)2160	(32)2560	(52)4160
5. Faculty Workroom	360	360	360
6. Conference-Seminar	320	320	320
7. Food Service:			
a. Eating Stand Up Area	(30)300	(35)350	(40)400
b. Student Lounge	(14)210	(18)270	(20)300
c. Vending Alcove(s)	60	60	80
d. Faculty Lounge	(24)360	(39)585	(61)915
e. Storage	125	175	260
8. Lockers [a]	180	235	400
9. Student Carrels	(14)350	(16)400	(27)675
Division Center Sub-Total	5305	6195	8750

TABLE 19 (Cont'd)

DIVISION OF PHYSICAL SCIENCES & MATHEMATICS

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Physical Sciences Laboratories			
10. Physics Lab (24)	(1)1200	(2)2400	(2)2400
a. Physics Prep. Rm, Optics & Dark Room	200	400	400
b. Physics Shop & Prep. Room	1200	1600	1600
c. Physics Storage Room	200	200	200
11. Chemistry Lab (General Purpose)(24)	(1)1200	(2)2400	(3)3600
a. Chemistry Balance Room	260	260	260
b. Quantative Balance Room	120	120	120
c. Chem/Quan Balance Prep. Room	120	120	120
12. Chemistry Lab (organic) (24)	(1)1200	(1)1200	(1)1200
a. Organic Chem Prep Rm	120	120	120
13. Chemistry Stockroom	500	650	800
14. Chemistry Acid Storage	150	150	150
15. Chemistry Bulk Storage	160	200	240
16. Earth Science Lab (30)	(1)1500	(1)1500	(1)1500
a. Earth Science Prep Room	160	160	160
b. Earth Science Storage[b]	-	-	-
17. Planetarium	-	-	2000
a. Planetarium Prep Room & Storage	-	-	160
18. Project Laboratories for Physical Science(4)[c]	-	(2)200	(3)360
19. Radio-active Storage	-	120	120

TABLE 19 (Cont'd)

DIVISION OF PHYSICAL SCIENCES & MATHEMATICS

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Physical Sciences Laboratory Sub-Total	8290	11,800	15,510
Mathematics Instruction			
20. Mathematics Classroom(35)	(6)3570	(7)4165	(12)7140
21. Mathematics Lab (30)[d]	-	(1)1500	1500
Mathematics Lab Sub-Total	3570	5665	8640
Division Physical Sciences & Mathematics TOTAL	17,165	23,660	32,900

a. Lockers Sq.Ft. = .4 x FTE Students ÷ 6 Divisions

b. Share with physics storage

c. To be located adjacent to independent study carrels and academic offices

d. To accomodate programmed learning

TABLE 20

DIVISION OF LIFE & HEALTH SCIENCES

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Division Center			
1. Division Chairman's Office	150	150	150
a. Secretary & Reception	125	125	125
b. Filing & Storage	55	55	55
2. Life Sciences Chairman's Office	120	120	120
a. Secretary & Reception	105	105	105
b. Filing & Storage	50	50	50
3. Health Sciences Chairman's Office	120	120	120
a. Secretary & Reception	105	105	105
b. Filing & Storage	50	50	50
4. Faculty Offices:			
a. Life	(8)640	(9)720	(15)1200
b. Health	(7)560	(10)800	(13)1040
5. Faculty Workroom	360	360	360
6. Conference Seminar	320	320	320
7. Food Service:			
a. Eating Standing Up Area	(30)300	(35)350	(40)400
b. Student Lounge	(14)210	(18)270	(20)300
c. Vending Alcove(s)	60	60	80
d. Faculty Lounge	(13)195	(23)345	(33)495
e. Storage	125	175	260
8. Lockers [a]	180	235	400
9. Student Study Carrels	(11)275	(19)475	(33)825
Division Center Sub-Total	4105	4990	6560

TABLE 20 (Cont'd)
DIVISION OF LIFE & HEALTH SCIENCES

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Life Sciences Laboratories			
10. Biology Laboratories(24)	(2)2400	(2)2400	(3)3600
a. Bio Lab Prep Room	(2)600	(2)600	(3)1200
11. Microbiology Lab (24)	1200	(1)1200	(2)2400
a. Microbiology Lab Prep Room	400	400	400
12. Anatomy & Physiology Laboratory (24)	1200	(1)1200	1200
a. Anatomy & Physiology Prep Room	400	400	400
b. Cadaver Storage	40	40	40
13. Zoology Laboratory[b] (24)	-	1200	1200
a. Zoology Lab. Prep Room	-	240	240
b. Animal House	240	240	240
14. Botany Laboratory[c] (24)	-	-	1200
a. Botany Lab Prep Room	-	-	200
b. Greenhouse	300	300	600
15. Storage, Central for Life Science	800	800	1000
16. Radioactive Storage	-	120	120
17. Life Science Project Labs (4)	-	(2)400	(4)800
Life Science Lab Sub-Total	7580	9540	14,840
Health Science Laboratories			
Nursing			
18. Multipurpose Room (8 beds) including Storage & Utility	2000	2000	2000

TABLE 20 (Cont'd)

DIVISION OF LIFE & HEALTH SCIENCES

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Health Science Laboratories			
Nursing (Cont'd)			
19. Student Conference Rooms[d] (16)	288	288	(3)864
20. Teaching Aids Storage	120	120	120
21. Classroom (45)	-	-	720
22. Nurses Locker, Dressing Room & Toilets	300	300	388
Medical Assistant			
23. Medical Assistant Laboratory (24)	-	1200	1200
24. a. Storage	-	120	120
Dental Assistant			
24. Dental Assistant Lab(24)[e]	720	(1)720	(2)1440
General Area			
25. Medical, Dental Ass't. Medium Group Lecture Demo Room(45) [f]	675	675	(2)1350
Health Science Sub-Total	4103	5423	8202
Life and Health Sciences Total	15,788	19,953	29,602

a. Lockers Sq.Ft. = .4 x FTE Students ÷ 6 Divisions

b. Use A & P Lab, Phase I

c. Use Biology Lab, Phase I & II

d. 18 Sq.Ft./Sta.

e. 30 Sq.Ft./Sta.

f. Dual purpose as overflow space for nursing program. (15 Sq.Ft./Sta)

TABLE 21

MATHEMATICS, PHYSICAL, LIFE AND HEALTH SCIENCES CLASSROOMS

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Large Group Instruction			
1. Lecture-Demo Classrooms(100)	(2)3000	(3)4500	(4)6000
2. Central Rear-view projection area & Storage	1200	1800	1800
3. Prep Room Storage & Control	500	800	800
Classroom and Large Group Instruction Sub-Total	4700	7100	8600

TABLE 22

DIVISION OF SOCIAL SCIENCES

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Division Center			
1. Division Chairman's Office	150	150	150
a. Secretary & Reception	125	125	125
b. Files & Storage	55	55	55
2. Faculty Offices	(14)1120	(17)1360	(28)2240
3. Faculty Workroom	360	360	360
4. Conference - Seminar	320	320	320
5. Food Service:			
a. Eating Stand-Up Area	(30) 300	(35) 350	(40) 400
b. Student Lounge	(14) 210	(18) 270	(20) 300
c. Vending Alcove(s)	60	60	80
d. Faculty Lounge	(12) 180	(21) 315	(33) 495
e. Storage	125	175	260
6. Lockers[a]	180	235	400
7. Student Study Carrels	(20) 500	(24) 600	(39) 975
8. Classrooms[bc]	-	-	-
Division of Social Sciences Total	3685	4375	6160

a. Lockers Square Feet = $\frac{.4 \times \text{FTE Students}}{6 \text{ Divisions}}$

b. Large Group Instruction provided in Large Group Instructional Center.

c. Small Group Instruction provided in Division of Humanities Classrooms.

TABLE 23

LARGE GROUP INSTRUCTIONAL CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Large Group			
1. Lecture Demonstration Classroom (125)	(2)2750	(2)2750	(3)4125
a. Projector Area & Storage (Rear View)	1200	1200	1200
b. Prep Room Storage & Control	800	800	800
2. Lecture Demonstration Classroom (250)	-	2400	2400
a. Rear View Projection & Storage	-	800	800
b. Preparation & Storage	-	800	800
c. Conventional Projection	-	80	80
Sub-Total	4750	8830	10,205
Small Group			
3. Individual Carrels	(8)240	(10)300	(10)300
4. Divisible Seminar Rooms	(2)1000	(2)1000	(3)1500
Sub-Total	1240	1300	1800
Large Group Instructional Center Total	5990	10,130	12,005

TABLE 24

DIVISION OF HUMANITIES & FINE ARTS

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Division Center			
1. Division Chairman's Office	150	150	150
a. Secretary & Reception	125	125	125
b. Filing Storage	55	55	55
2. Faculty Offices[a]	(9) 720	(11) 880	(18) 1440
3. Faculty Workroom	360	360	360
4. Conference-Seminar	320	320	320
5. Food Service			
a. Eating Stand-Up Area	(30) 300	(35) 350	(40) 400
b. Student Lounge	(14) 210	(18) 270	(20) 300
c. Vending Alcove(s)	60	60	80
d. Faculty Lounge	(21) 315	(36) 540	(56) 840
e. Storage	125	175	260
6. Lockers[b]	180	235	400
7. Student Study Carrels	(31) 775	(35) 875	(60)1500
Division Center Sub-Total	3695	4395	6230
Classroom Laboratory Area			
8. Classroom (35)[c]	(4)2380	(5)2965	(8)4760
Classroom Sub-Total	2380	2965	4760
Division Center Total	6075	7360	10,990

[a] Except Departments - includes Foreign Language, Speech, Philosophy.

[b] Lockers Square Feet = $\frac{.4 \times \text{FTE Students}}{6 \text{ Divisions}}$

[c] Language Laboratory in Learning Resources Center.

TABLE 24 (Continued)

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Department of English			
Department Center			
1. Department Chairman's Office	150	150	150
a. Secretary & Reception	125	125	125
b. Filing & Storage	55	55	55
2. Faculty Offices[a]	(15)1200	(18)1440	(30)2400
3. Faculty Workroom	320	320	320
4. Faculty Lockers	(15) 45	(18) 54	(30) 90
Department Center Sub-Total	1895	2144	3140
Classroom-Laboratory Area[bc]			
5. Reading Lab. (25)	875	875	(2)1750
6. Classroom (35)	(7)4165	(9)5355	(14)8330
Classroom-Lab. Sub-Total	5040	6230	10,080
Department of English Total	6935	8374	13,220

a. Includes Journalism & Drama.

b. Journalism in College Union.

c. Large Group Instruction in Large Group Instruction Center.

TABLE 24 (Continued)

Enrollment Level FTE Students	I 2800	II 3500	III 6000
Department Of Fine And Applied Arts			
Department Center			
1. Department Chairman's Office	-	-	150
a. Secretary & Reception	-	-	125
b. Filing & Storage	-	-	55
2. Faculty Offices[a]	(5) 800	(8)1280	(11)1760
3. Faculty Workroom	320	320	320
4. Faculty Lockers[b]	(5) 15	(8) 24	(11) 33
5. Student Lockers	36	(25) 36	(41) 62
Department Center Sub-Total	1171	1660	2505
Classroom-Laboratory Area			
6. Painting Studios (25)	(2)2500	(2)2500	(3)3750
a. Storage Room	240	240	360
b. Workroom	160	160	160
7. General Art Lab (25) For Commercial Art, Industrial Design, Interior Design, etc.	1250	1250	1250
a. Storage Room	120	120	120
b. Workroom	120	160	160
8. Graphics Laboratory (10)	-	600	600
a. Darkroom	-	240	240
b. Equipment Storage	-	160	160
9. Ceramic Studio (25)	-	1000	1000
a. Kiln Room	-	360	360
b. Glaze Room	-	160	160
c. Damp Room	-	120	120
d. Ceramic Storage	-	180	180

TABLE 24 (Continued)

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Classroom-Laboratory Area (Continued)			
10. Photographic Studio (20)[c]	-	-	600
11. Weaving Studio (10)	-	-	1200
a. Dyeing Room	-	-	180
b. Storage Room	-	-	120
12. Sculpture Studio (20)	-	-	1500
a. Equipment Storage	-	-	200
b. Outdoor Sculpture[d] Workspace, walled	-	-	(800)
13. Lecture Classroom (45)[e]	720	(2)1440	(3)2160
Classroom-Laboratory Sub-Total	5110	8690	14,580
Fine & Applied Arts Total	6281	10,350	17,085

a. 160 Square Feet/Station.

b. 3 Square Feet/Locker.

c. Photo studio and Graphic Lab to share darkroom.

d. Not included in Bldg. square feet total.

e. Dual Purpose Room for Music & Art.

TABLE 24 (Continued)

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Music Department			
Department Center			
1. Department Chairman's Office	-	-	150
a. Secretary & Reception	-	-	125
b. Filing & Storage	-	-	55
2. Faculty Offices[a]	(4) 640	(4) 640	(7)1120
Faculty Lockers	(4) 12	(4) 12	(7) 21
Department Center Sub-Total	652	652	1471
Classroom-Laboratory Area			
3. Music Theory (40)[b]	1000	1000	1000
4. Choral Group (100)[c]	-	1600	1600
a. Choral Library & Robing Room	-	400	400
b. Individual Choral Practice Rooms & Piano Rooms[d]	-	(2) 240	(4) 480
5. Instrument Rehearsal Room (100)	2000	2000	2000
a. Instrument Uniform Room	300	300	300
b. Instrument Library	160	160	160
c. Instrument Storage Room	800	800	800
d. Individual Instrument Practice Rooms[e]	(8)480	(10) 600	(12) 720
e. Ensemble Practice Rooms	-	400	400
6. Music Appreciation Classroom (100)[f]	-	1000	1000

TABLE 24 (Continued)

Enrollment Level FTE Students	I 2800	II 3500	III 6000
Music Department (Continued)			
Classroom-Laboratory Area (Continued)			
Classroom-Laboratory Sub-Total	4740	8500	8860
Music Department Total	5392	9152	10,331
Division of Humanities TOTAL	24,683	35,236	51,626

a. 160 Square Feet/Station.

b. 25 Square Feet/Station.

c. General Music Room at Levels I and II.

d. 120 Square Feet.

e. 60 Square Feet/Station.

f. 10 Square Feet/Station.

TABLE 25

DIVISION OF BUSINESS AND ELECTRONIC DATA PROCESSING

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Division Center			
1. Division Chairman's Office	150	150	150
a. Secretary & Reception	125	125	125
b. Files & Storage	55	55	55
2. Faculty Offices:			
a. Business	(9)720	(11)880	(18)1440
b. EDP	(1)80	(1)80	(2)160
3. Faculty Workroom	360	360	360
4. Conference Seminar	320	320	320
5. Food Service:			
a. Eating Stand Up Area	(30)300	(35)350	(40)400
b. Student Lounge	(14)210	(18)270	(20)300
c. Vending Alcove(s)	60	60	80
d. Faculty Lounge	(9)135	(14)210	(24)360
e. Storage	125	175	260
6. Lockers [a]	180	235	400
7. Student Study Carrels	(12)300	(14)350	(24)600
Division Center Sub-Total	3120	3620	5010

TABLE 25 (Cont'd)

DIVISION OF BUSINESS AND ELECTRONIC DATA PROCESSING

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Classroom & Laboratories			
7. Typing Laboratories(40)	(2)1200	(2)2400	(3)3600
8. Shorthand Laboratories (35)	(1)700	(1)700	(2)1400
9. Accounting Laboratory(40)	-	1200	1200
10. Accounting Adding Machine Laboratory(35)	1050	1050	1050
11. Office Procedures Lab(30)	1200	1200	1200
12. Data Processing Lab[b](15)	-	600	600
13. Marketing - Merchandising Laboratory(40)	1200	1200	1200
14. Business Management Classroom (45)	-	720	720
15. General Purpose Lab-Classroom	-	1200	1200
16. Duplicating Room	400	400	400
17. Classroom (45)	(2)1440	(2)1440	(2)1440
Classroom Lab Sub-Total	7190	12,110	14,010
Division Business & E.D.P. TOTAL	10,310	15,730	19,020

a. Lockers Sq. Ft. = .4 x FTE Students ÷ 6 Divisions

b. Locate near Data Processing

TABLE 26

DIVISION OF OCCUPATIONAL EDUCATION

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Division Center			
1. Division Chairman's Office	150	150	150
a. Secretary & Reception	125	125	125
b. Files & Storage	55	55	55
2. Personal & Public Services Chairman's Office	-	-	120
a. Secretary	-	-	105
b. Files & Storage	-	-	50
3. Engineering Chairman's Office	-	-	120
a. Secretary	-	-	105
b. Files & Storage	-	-	50
4. Technology Chairman's Office	-	-	120
a. Secretary	-	-	105
b. Files & Storage	-	-	50
5. Faculty Offices[a]	(12) 960	(14)1120	(28)2240
6. Faculty Workroom	360	360	360
7. Conference - Seminar	320	320	320
8. Food Service:			
a. Eating Stand Up Area	(30) 300	(35) 350	(40) 400
b. Student Lounge	(14) 210	(18) 270	(20) 300
c. Vending Alcove(s)	60	60	80
d. Faculty Lounge	(11) 165	(17) 255	(33) 495
e. Storage	125	175	260
9. Lockers[b]	180	235	400
10. Student Study Carrels	(16) 400	(25) 625	(51)1275
Division Center Sub-Total	3410	4100	7285

TABLE 26 (Continued)

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Personal & Public Services			
11. Home Economics Labs			
a. Food Lab (25)	1250	1250	1250
b. Clothing Lab (25)	-	-	1000
c. Storage	300	300	300
12. Police Science Labs			
a. Crime Research Lab (25)	-	-	1250
b. Photo Printing	-	-	240
c. Photo Finishing	-	-	240
d. Darkroom	-	-	160
e. Classroom (30)[c]	750	750	750
13. General Classroom (35)	-	(2)1190	(3)1785
Personal & Public Services Sub-Total	2300	3490	6975
Engineering Technologies			
14. Drafting Rooms (25)	(2)3000	(3)4500	(5)7500
a. Storage Workroom	600	600	(3)1800
b. Print Room	160	160	160
15. Surveying Laboratory (25)	1250	1250	1250
a. Storage	400	400	400
16. Electronics Lab (25)	1500	(2)3000	(3)4500
a. Prep & Equip. Room	130	260	520
b. Storage	100	200	400
17. Optics Laboratory (25)[d]	-	-	1500
18. Classroom (45)	720	(2)1440	(3)2160
19. Aeronautics Lab[e]	-	-	13,000
20. Welding[e]	-	-	7500
21. Machine Shop[e]	-	-	7000

TABLE 26 (Continued)

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Engineering Technologies (continued)			
22. Air Conditioning & Refrigeration[f]	-	(1)5000	(2)10,000
23. Flexible Multi-Purpose Laboratory[g] (50 Sta/125 Sq. Ft.)	6250	6250	6250
24. Building Trades	-	-	13,000
25. Auto Shop	5000	5000	5000
26. Diesel Shop	-	-	6000
27. Landscape Architecture[h]	-	-	-
28. Ornamental Horticulture[h]	-	-	-
29. Greenhouse[i]	-	2000	4000
30. Lath House[j]	-	-	3000
31. Agricultural Machine Shop[j]	-	-	4000
32. Outdoor Agricultural Areas[k]	-	-	-
33. Feed Lots[k]	-	-	-
34. Demonstration Plots[k]	-	-	-
35. Hotel Administration[l]	-	-	-
36. Classroom (45)[m]	720	720	(2)1440
Engineering Technology Sub-Total	19,830	30,780	100,380
Occupational Education Total	25,540	38,370	114,640

a. Does not include offices for Hotel-Restaurant (under College Union) & Program under items 19 through 34 (included in assignable square footage).

b. Lockers Square Feet = $\frac{.4 \times \text{FTE Students}}{6 \text{ Divisions}}$

TABLE 26 (Continued)

c. Convert to Mock Courtroom.

d. 60 Square Feet/Station.

e. Use Multi-Purpose Laboratory Phase I & II.

f. Use Multi-Purpose Laboratory Phase I.

g. Temporary space for trial occupational technical programs.

h. Combined under Greenhouse.

i. 2000 Square Feet alternate off Campus.

j. Alternate: Off Campus.

k. Off Campus

l. Located in College Union.

m. For programs under items 19 through 34.

TABLE 27

PHYSICAL EDUCATION FACILITIES

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Gymnasium			
Lobby Area:			
1. Entrance & Foyer	-	-	3750
2. Ticket Booth	-	-	100
3. Public Telephones	-	-	(4)30
4. Concession & Storage	-	-	500
5. First Aid Alcove	-	-	70
6. Coats	-	-	-
Sub-Total	-	-	4450
Indoor Athletics			
7. Basketball Courts (2 practice, 1 contest)	-	-	14,500
a. Bleachers (5000)			
b. Main Floor (1500)	-	-	3750
c. Balcony (3500) Multi Purpose	-	-	8750
d. Press Box	-	-	240
e. Equipment Storage	-	-	1000
f. Women's Gymnasium	-	-	-
8. Dance Studio, Multi-purpose room combination	-	-	2800
a. Costume Room	-	-	160
b. Storage	-	-	160
9. Indoor-Outdoor Olympic Pool	-	-	12,375
a. Bleachers (300)	-	-	1200
b. Deck Area	-	-	6300
c. Equipment & Storage Room	-	-	1600

TABLE 27 (Cont'd)
PHYSICAL EDUCATION FACILITIES

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Gymnasium			
Indoor Athletics (Cont'd)			
10. Indoor Handball Court(2)	-	-	2400
Sub-Total	-	-	55,235
Men's Locker Room			
11. Main Locker Room	3015	3849	6600
a. Shower Room	760	760	1200
b. Toweling Area	450	570	825
c. Toilet Room	512	512	768
12. Team Locker Room	605	605	605
a. Shower Room	220	220	220
b. Toilet Room	328	328	328
c. Training Room	175	175	175
13. Visiting Team-Intramural Dual Purpose Locker Room	605	605	605
a. Shower Room	220	220	220
b. Toilet Room	328	328	328
14. Coaches Room	300	300	300
15. Faculty Locker Room	123	123	240
a. Shower Room	80	80	140
b. Toilet Room	100	100	120
16. Central Towel & Issue Room	600	600	600
17. Central Work Room	400	400	400
18. Central Storage Room	300	300	300
a. Equipment Drying Room	250	250	250

TABLE 27 (Cont'd)

PHYSICAL EDUCATION FACILITIES

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Men's Locker Room (Cont'd)			
19. First Aid Room	360	360	360
a. Storage	40	40	40
b. Toilet	60	60	60
Sub-Total	9831	10,785	14,684
Women's Locker Room			
20. Main Locker Room	1989	2472	4242
a. Cubicle Dressing Room	572	682	1166
b. Cubicle Shower Room	154	154	220
c. Shower Rooms	540	540	780
d. Toweling Area	375	375	555
e. Hair Drying Room	560	560	840
f. Powder Room	500	500	750
g. Toilet Room	208	208	312
21. Faculty Locker Room			
a. Storage Locker	39	39	66
b. Dressing Cubicle & Lockers	132	132	242
c. Cubicle Shower Room	44	44	88
d. Toilet	100	100	100
22. Central Towel & Issue Area	600	600	600
23. Central Work Room	400	400	400
24. Central Storage	300	300	300
25. First Aid	240	240	240
a. Storage	40	40	40
b. Toilet	60	60	60
Sub-Total	6853	7446	11,001

TABLE 27 (Cont'd)

PHYSICAL EDUCATION FACILITIES

Enrollment Level		I	II	III
FTE Students		2800	3500	6000
Classroom Area				
26.	45 Station Lecture classrooms, 1 divisible room on 45 station module, to produce 90 stations	(1)720	(2)1440	(3)2160
	Sub-Total	720	1440	2160
Department Center				
27.	Director's Office	180	180	180
	a. Secretary & Reception	145	145	145
	b. Storage & Filing	65	65	65
28.	Faculty Work Room	320	320	320
29.	Faculty Offices	(11)880	(13)1040	(20)1600
30.	Conference (15)	300	300	300
	Sub-Total	1890	2050	2610
Gymnasium TOTAL		19,294	21,721	90,140

TABLE 27 (Cont'd)

PHYSICAL EDUCATION FACILITIES

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Outdoor Athletics			
Turfed Areas			
31. Stadium Seating			
a. Removable Bleachers	10,500	(3500) 10,500	
b. Permanent Bleachers	-	-	(6000) 24,000
c. Football Field & 880 Yd. track	230,000	230,000	230,000
d. Other (Toilets,etc.)	-	-	1120
32. Practice Football Field	-	-	135,000
33. Varsity Baseball Practice & Game Field	202,500	202,500	202,500
34. Softball Field	-	-	90,000
35. Archery	-	-	135,000
36. Discus & Shotput	-	10,000	10,000
37. Horseshoes	-	-	7200
Sub-Total	443,000	453,000	834,820
Hardsurface Area			
38. Tennis	72,000	72,000	72,000
Sub-Total	72,000	72,000	72,000
Field Storage Building	-	-	6000
Outdoor Athletics TOTAL	515,000	525,000	912,820

TABLE 28

LEARNING RESOURCES CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Volumes	41,800	49,500	77,000
Reading Stations	504	700	1080
Library			
Lobby Lounge Area			
1. Lobby-Display-Lounge	1000	1000	1000
2. Telephone (2)	15	15	15
3. Reading Area	640	640	800
Sub-Total	1655	1655	1815
Circulation; Card Catalog; Reserve Books			
4. Circulation Desk	350	350	350
5. Card Catalog	198	198	308
6. Workroom	180	180	180
7. Reserve Book Stack	85	125	250
Sub-Total	813	853	1088
Main Stack Area			
8. Open Stacks	3655	4270	6115
9. Closed Stacks[a]	1600	1700	2000
10. B Type Carrels	400	400	1000
Sub-Total	5655	6370	9115

TABLE 28 (Cont'd)
LEARNING RESOURCES CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Reference Area			
11. Reference Desk	120	120	120
12. Reference Office	120	120	120
13. Reference Card Catalog	20	20	30
14. Reference Stacks	300	625	938
15. Table & Chairs adaptable to A type Carrels	600	900	1500
16. B Type Carrels	175	225	375
Sub-Total	1335	2010	3083
Bibliographic Area			
17. Standup Table	75	75	80
18. Table & Chairs adaptable to A type Carrels	150	175	300
19. Bibliographic Stacks	286	357	357
Sub-Total	511	607	737
Newspaper Area			
20. Newspaper Racks & Bound Papers	72	72	144
21. Tables & Chairs adaptable to A type Carrels	125	175	300
Sub-Total	197	247	444

TABLE 28 (Cont'd)

LEARNING RESOURCES CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Periodical Area			
22. Current Periodical Stacks	200	300	500
23. Bound Periodical Stacks	189	222	468
24. Microfilm Stacks	50	80	133
25. Microfilm Readers	50	75	125
26. Table & Chairs adaptable to A type Carrels	750	900	1500
27. B Type Carrels	175	225	375
28. Periodicals Desk	120	120	120
Sub-Total	1534	1922	3221
General Study - Conference Area			
29. Conference - Seminar Rooms[b]	300	(2)600	(4)1200
30. Student - Small Group Study Rooms[c]	(5)500	(10)1000	(20)2000
31. Main Reading Room Table & Chairs adaptable to A type Carrels[d]	5050	7700	10,925
Sub-Total	5850	9300	14,125
Work & Office Area			
32. Head Librarian's Office	150	150	150
a. Secretary	85	85	85
33. Technical Processes Area, including space for work-room, binding, storage & receiving	1000	1500	2000

TABLE 28 (Cont'd)
LEARNING RESOURCES CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Work & Office Area (Cont'd)			
34. Staff Room	200	300	300
35. Clerical	-	85	85
36. Assistant Librarians	100	100	(3)300
Sub-Total	1535	2220	2920
Special Areas			
37. Rare Book Vault	-	71	107
38. Typing Room(10)	200	250	400
Sub-Total	200	321	507
Library Area Sub-Total	19,285	25,505	37,055

TABLE 28 (Cont'd)
LEARNING RESOURCES CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Audio Visual & Instruction Media			
1. Audio Listening Room	2700	3575	5000
2. D Type Carrel	500	675	875
3. E Type Carrel	-	-	875
4. Language Lab(30)	750	750	750
5. Faculty Listening Rooms	(2) 160	(2)160	(2)160
6. Audio Circulation Desk	250	500	500
7. Cataloging & Workroom	200	300	500
8. Audio Catalog File	50	50	50
9. Audio Stacks			
a. Tapes (audio)	80	80	136
b. Records	160	192	328
c. Storage (film strips, movie film, slides,etc.)	800	1000	1200
10. Audio-visual Storage, Receiving, Maintenance & Repair Workroom ^{e}	2000	3000	4000
11. Audio Control Room	300	300	300
Sub-Total	7950	10,582	14,674

TABLE 28 (Cont'd)

LEARNING RESOURCES CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Production & Support Facilities[f]			
Office Area			
12. Audio Visual Director	150	150	150
a. Secretary and Recep.	-	125	125
b. File and Storage	-	55	55
13. Engineer's Office	-	100	200
14. Production Staff Offices	100	(2)200	(4)400
Sub-Total	250	630	930
Conference & Preview Area			
15. Conference Rooms[g](10)	250	250	(2)500
16. Preview Rooms	320	320	320
17. Teacher Prep. Room	160	160	160
Sub-Total	730	730	980
Production Area			
18. Graphics Production[h]	350	640	640
19. Photography	200	300	300
20. Storage	100	150	150
Sub-Total	650	1090	1090

TABLE 28 (Cont'd)

LEARNING RESOURCES CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
TV & Film Studio			
21. TV Studio	-	1200	1200
a. Set Preparation & Storage	-	400	400
b. Workshop	-	200	200
22. Control Room (with provisions for audio tape production)	-	300	300
23. Editing Room	-	300	300
24. Videotape Storage	-	120	120
25. Motion Picture Workshop & Storage	-	200	200
26. Faculty Offices	-	-	(3)300
Sub-Total	-	2720	3020

Audio-Visual & Instruction Media Total	9580	15,752	20,744

TABLE 28 (Cont'd)

LEARNING RESOURCES CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Administrative Suite			
1. Director of Learning Resources' Office	180	180	180
a. Secretary	145	145	145
b. Filing & Storage	65	65	65
Sub-Total	390	390	390
Learning Resources Center TOTAL	29,255	41,647	58,089

a. Allow 20% of collection plus 800 sq.ft. for miscellaneous storage.

b. Conference tables and chairs.

c. Dispersed throughout library.

d. Subdivide into 30 or 40 groupings by interspersing stacks or other facilities.

e. Serve audio and TV large-group instruction and campus-wide audio-visual equipment.

f. These facilities should support the large-group instruction lecture demo. rooms as well as the Learning Resources Center.

g. Used jointly by TV lecture demo.

h. Used jointly by TV lecture demo.

TABLE 29

COLLEGE UNION

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
(1.2) Head Count	3360	4200	7200
(90%) Peak Load	3024	3780	6480
Food Services & Related Areas			
Lounge Areas			
1. Lounge*	-	3850	5450
a. Outdoor Lounge	1400	1650	1925
b. Storage	-	300	500
c. Outdoor Storage	100	100	200
2. Lobby-Lounge[a]			
3. Faculty-Student Alcove[b]			
4. Multi-Purpose Room*[c]			
5. Meeting-Dining Banquet Rooms*[d]			
6. Faculty Lounge[e]	-	300	600
a. Storage	-	60	100
7. Quiet-Cot Rooms[f]	-	600	600
a. Storage	-	80	80
8. Music Listening &	-	(60) 800	(80)1600
Recreational Reading[g]	-	(20) 400	(30) 600
a. Storage	-	100	100
9. Art Exhibition Area[h]			
10. Display Cases	-	200	400
11. Open Air Forum	-	3000	3000
Lounge Area Sub-Total	-	6690	10,030
Outdoor Area Sub-Total	1500	4750	5125

* If all multi-purpose areas are joined, reduce all by 10%.

TABLE 29 (Continued)

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Dining Area			
12. Snack Bar - Cafeteria*	(350)3500	(480)4800	(610)6100
a. Outdoor Area	1750	2400	2520
13. Multi Purpose*	(166)2000	(350)4500	(385)4800
a. Outdoor Area	490	750	975
14. Dining-Meeting-Banquet Conference Rooms*	-	(200)3000	(200)3000
15. Special Dining Atmosphere Room*	-	(60) 900	(60) 900
16. Faculty Dining	(20) 300	(40) 600	(60) 900
17. Storage for Above (dispersed)	900	1200	2000
a. Outdoor Storage	-	-	400
18. Vending Alcoves	500	500	500
Dining Area Sub-Total	7200	15,500	18,200
Outdoor Area Sub-Total	2240	3150	3895
Kitchen			
19. Kitchen (Sized to accomodate restaurant administration, culinary arts program)			
a. Serving Areas/Scramble	2000	2000	2700
b. Special Food Alcoves	400	400	400
c. Fountain	400	400	400
d. Cooking	1200	1200	1200
e. Vegetables[1]	300	300	300
f. Salad[1]	400	400	400
g. Butcher Shop	250	250	250
h. Bake Shop	1600	1600	1600
i. Pastry Refrigerator	200	200	200

TABLE 29 (Continued)

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Kitchen (Continued)			
j. Refrigerators (3)	600	600	600
k. Freezers (3)	300	300	300
l. Offices	120	120	(3) 360
m. Dry Storage	2000	3000	3000
n. Dishwashing	1000	1000	1000
o. Garbage	250	250	250
p. Servery	400	400	400
Kitchen Sub-Total	11,420	12,420	13,360
Restaurant Administration Culinary Arts Program			
Offices			
20. Program Director's Office	150	150	150
a. Secretary & Reception	125	125	125
b. Filing & Storage	55	55	55
21. Coordinator Food Service	120	120	120
22. Clerical Office	-	85	170
23. Bake Shop Office	120	120	120
24. Cafeteria, Snack Bar Office	-	120	120
25. Faculty Offices (Chefs)	(2) 240	(3) 360	(6) 720
Classroom Space			
26. Lecture Demonstration Classroom (100 stations)	-	-	1500
27. Classroom (50)	-	750	750
Culinary Arts Library			
28. a. 3500 Volumes	-	-	350
b. 120 Periodicals	-	-	120
c. 30 Reader Stations	-	-	900
d. Files (10)	-	-	80

TABLE 29 (Continued)

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Restaurant Administration Culinary Arts Program (Continued)			
Culinary Arts Library (Continued)			
e. Workroom	-	-	120
Student Locker & Toilet Rooms			
29. Men (80%)	800	1000	1800
30. Women (20%)	300	400	600
Restaurant Administration Culinary Arts Program Sub-Total	1910	3285	7800
Staff & Administration			
31. Lounge	350	500	800
32. Storage	100	100	200
33. Lockers	100	100	100
Employees & Administration Sub-Total	550	700	1100
Food Services & Related Areas Sub-Total	21,080	38,595	50,490
Outdoor Areas Sub-Total	3740	7900	9020
Headquarters for Student Activities			
34. Student Body President's Office	150	150	150
35. Student Executive Officer's Office	200	200	400
36. Coordinating Organizational Offices	300	400	600
37. Conference Room	200	200	200
38. Student Legislative Chamber	400	400	400
39. General Work Areas	600	1000	2000

TABLE 29 (Continued)

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Headquarters for Student Activities (Continued)			
40. Duplicating and Poster Work Room	200	200	400
41. All Purpose-Temporary Assignment Offices	-	200	400
42. Storage Lockers for Organizations & Organizational Mail Boxes	200	200	200
a. Storage	200	300	400
43. Student Publications (campus newspaper, yearbook & journalism instruction)	1000	1000	2000
a. Storage	200	200	300
Headquarters for Student Activities Sub-Total	3650	4450	7450
Student Activities Staff Offices			
44. College Union Manager & Program Advisor	150	150	150
45. Secretarial Area	85	85	(2) 170
46. Workroom	120	120	120
a. Storage	100	100	100
47. Master Calendar	50	50	50
48. Director of Student Govt. & Activities	180	180	180
a. Secretary & Reception	145	145	145
b. Storage & Files	60	60	60
Student Activities Staff Offices Sub-Total	890	890	975

TABLE 29 (Continued)

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Student Health Services			
49. Nurses Office & Examination Room	200	200	200
50. Reception & Clerical Area	-	160	160
51. Treatment Room	-	240	240
52. Women's Cot Room & Toilet	160	160	160
53. Men's Cot Room & Toilet	160	160	160
54. Storage	80	80	80
Student Health Services Sub-Total	600	1000	1000
Activities Information Center			
55. Information Center	200	200	200
56. Scheduling Office	200	200	200
57. Communication Center*	200	200	200
58. Storage	200	200	200
Activities Information Center Sub-Total	800	800	800
Sales Service			
59. Post Office (contract station)	-	500	500
60. Powder Room	-	300	300
61. Bookstore	5600	7400	11,800
a. Offices	(400)	(400)	(800)
b. Merchandising & Display	(3600)	(5000)	(8000)
c. Storage	(1600)	(2000)	(3000)
Sales Service Sub-Total	5600	8200	12,600

* Includes Ticket Office, Lost & Found, Telephones, Public Address & Sound System, Bulletin Boards, Lighted Display Case, Lighted Message Marquee, Message Center for Students.

TABLE 29 (Continued)

Service Area			
62. Receiving & Holding Area	400	400	600
63. Office	100	100	100
64. Janitor's Headquarters	200	200	200
65. Dock (Calculated by Architect)			
66. Trash Room	400	400	400
67. General Storage	2000	2000	3000
a. Outdoor Storage	-	-	1000
Service Area Sub-Total	3100	3100	4300
Outdoor Area Sub-Total	-	-	1000
Indoor Games & Recreation			
68. Billiards[j]	(4) 1200	(6) 1800	(10) 3000
69. Table Tennis[j]	(2) 600	(4) 1200	(6) 1800
70. Table Games & Lounge[j]	1000	1000	2000
71. Games Control Desk	-	200	200
72. Games Manager's Office	-	200	200
73. TV Room and Movies	-	400	800
74. Lockers (central ones, coin operated)	-	(130) 200	(200) 300
75. Outdoor Sports Headquarters	-	400	600
76. Storage	-	500	1200
Indoor Games & Recreation Sub-Total	2800	5900	10,100
College Union Total	38,520	62,935	87,715

TABLE 29 (Continued)

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Outdoor Area			
Patios, Food Services & Service Area	3740	7900	9020
Outdoor Games Area: Paved	2000	3000	5000
Grass	4000	5000	8000
Outdoor Service Storage	-	-	1000
Outdoor Storage (Weather Protected)	2000	3000	4000
Outdoor Areas Total	11,740	18,900	27,020

a. Gross square feet calculation by Architect.

b. Included in Lounge (1).

c. See Item 13.

d. See Item 14.

e. Locate adjacent to Faculty Dining Room.

f. Rest area for students.

g. Adjoining Main Lounge & Information Desk. Music Lending from Desk & Library.

h. All walls fitted as potential art areas.

i. Place vegetables & salad back to back with scramble serving area.

j. Combine in Phase I: to function as Multi-Purpose Room.

TABLE 30

THEATRE

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Little Theatre - Drama Speech, Recital; 450 Seats[a]			
1. Lobby[b]	-	630	630
2. Lounge[c]	-	1800	1800
3. Seating[d]	-	4050	4050
4. Control Booths	-	250	250
5. Stage/Dressing Room & Stage Facilities[e]	-	6400	6400
Little Theatre Total	-	13,130	13,130

a. Locate close to Departments of English, Art & Music; College Union

b. 1.4 sq.ft./Seat

c. 4 sq.ft./Seat - overflow in Outdoor Lounge of College Union

d. 9 sq.ft./Seat

e. Type of Stage not determined

TABLE 31

ADMINISTRATIVE CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Board of Trustees			
1. Board Room			
a. Board Table & Seating (8)	160	160	160
b. Press Area (4)	60	60	60
c. Staff Area (6)	90	90	90
d. Public Seating (20)	240	240	240
e. Kitchenette	80	80	80
f. Equipment & Furniture Storage	30	30	30
2. Conference Room (20)	400	400	400
Board of Trustees Sub-Total	1060	1060	1060
Presidential Suite			
3. President's Office, Conference & Work Area	400	400	400
a. Secretary & Reception Area	330	330	330
b. Files & Storage	145	145	145
4. Administrative Assistant	300	300	300
a. Secretary & Reception Area	250	250	250
b. Files & Storage	110	110	110
Presidential Suite Sub-Total	1535	1535	1535

TABLE 31 (Continued)

ADMINISTRATIVE CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Vice President for Business Affairs Suite			
5. Vice President's Office & Work Area	300	300	300
a. Secretary & Reception	250	250	250
b. Filing & Storage	110	110	110
6. Controller's Office	150	150	150
a. Secretary	85	85	85
7. Accountant's Office	150	150	150
8. Bursar's Office	150	150	150
9. Purchasing Clerk's Office	120	120	120
10. Payroll Clerk's Office	120	120	120
11. Inventory Clerk's Office	-	120	120
12. Workroom	160	160	160
13. Filing & Storage	240	280	300
14. Clerical	85	(3) 255	(4) 340
15. Waiting Room	120	120	120
16. Supervisor of Maintenance & Operations	120	120	120
a. Secretary	85	85	85
17. Building Inspector & Engineer's Office	-	100	100
18. Drafting Room	100	100	(2) 200
19. File & Storage	80	80	140
20. Clerical	-	85	(3) 255
21. Coordinator of Food Services[a]			
V.P. for Business Affairs Sub-Total	2425	2940	3375

TABLE 31 (Continued)

ADMINISTRATIVE CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Vice President for Instruction Suite			
22. Vice President's Office & Work Area	300	300	300
a. Secretary & Reception	250	250	250
b. Files & Storage	110	110	110
23. Conference Room (18)	360	360	360
24. Director of Continuing Education & Community Services Office	180	180	180
a. Secretary & Reception	145	145	145
b. Files & Storage	80	80	80
25. Director of Learning Resources Office[b]			
26. Alumni Relations Secretary's Office	-	100	100
a. Secretary	-	85	85
Vice President for Instruction Suite Sub-Total	1425	1610	1610

TABLE 31 (Continued)

ADMINISTRATIVE CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Vice President for Student Personnel Services Suite			
28. Vice President's Office & Work Area	300	300	300
a. Secretary & Reception	250	250	250
b. Files & Storage	110	110	110
Vice President for Student Personnel Services Suite Sub-Total	660	660	660
General Area			
29. Information & PBX Operator	160	160	160
30. Lobby & Reception			
a. Telephones (2)	15	15	15
31. General Service & Duplicating Room	350	500	650
32. Mail Room	200	240	240
33. Women's Lounge	160	160	160
34. General Storage	120	180	240
General Area Sub-Total	1005	1255	1465
Administrative Center Total	8110	9060	9705

a. Locate in Student Union

b. Locate in Learning Resource Center

TABLE 32

ADMISSIONS & REGISTRATION CENTER

Enrollment Level FTE Students	I 2800	II 3500	III 6000
Office Area			
1. Director of Admissions & Records & Counseling Office	180	180	180
a. Secretary & Reception	145	145	145
b. Filing & Storage	80	80	80
Office Area Sub-Total	405	405	405
Admissions Area			
2. Office of Admissions Advisor	150	150	150
a. Secretary	85	85	85
3. General Office			
a. Registration Secretary	85	85	85
b. Registration Clerk	85	85	85
c. Special Students Clerk	85	85	85
d. Records Clerk	85	85	85
e. Records Secretary	85	85	85
f. Filing Area [a]	130	130	130
g. Records Vault	380	380	480
h. Paper Storage	200	200	200
i. Student Waiting Area	400	400	400
Admissions Area Sub-Total	1770	1770	1870
Registration Area			
4. Registration Room	3000	3000	3000
5. Portable Table Room	360	360	360
6. Storage Room	200	200	200
7. Clerical Space [b]	600	600	600
Registration Area Sub-Total	4160	4160	4160
Admissions & Registration Total	6335	6335	6435

a. To be located in counter area.
b. To be separated from Registration Room by counter.

TABLE 33

COUNSELING & PLACEMENT CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Counseling Center			
1. Director of Counseling Office	180	180	180
a. Secretary & Reception	145	145	145
b. Files & Storage	55	55	55
2. Director of Student Gov't. & Activities [a]			
3. Placement Officer's Office	120	120	120
4. Counselor's Offices [b]	(6) 720	(8) 960	(14) 1680
5. Testing Room (35)	595	595	595
6. Student Waiting Area	200	200	200
7. Occupational Information Library	160	160	160
8. Conference/Seminar (16)	384	384	(2) 768
9. Storage & Filing	100	200	300
10. Clerical	85	(2) 170	(4) 340
Counseling and Placement Total	2744	3169	4543

[a] Locate in College Union

[b] 1/450 FTE Students

TABLE 34

ELECTRONIC DATA PROCESSING CENTER

Enrollment Level FTE Students	I 2800	II 3500	III 6000
Office Area			
1. Data Processing Manager's Office	-	-	150
a. Secretary & Reception	-	-	120
b. Files & Storage	-	-	40
2. Conference - Seminar (12)	-	-	240
Office Area Sub-Total	-	-	550
Operations Area			
3. Systems Supervisor Office	-	-	120
4. Analysts/Programmers Offices (2)	-	-	(4) 640
5. Key Punch Supervisor's Office	-	-	120
6. Key Punch Operators Room	-	-	640
7. Tape Librarian's Alcove	-	-	100
8. Tape Library [a]	-	-	240
9. Computer Room	-	-	1600
10. Senior Operator's Alcove	-	-	100
11. EAM Equipment Area	-	-	500
12. Control Room	-	-	500
13. Storage Area [b]	-	-	200
14. File Cabinet Area [c]	-	-	160
15. Supply Room [d]	-	-	400
16. Dead Storage Area	-	-	300
17. Clerical	-	-	425
18. Files & Storage	-	-	160
Operations Area Sub-Total	-	-	6205
Electronic Data Processing Total	-	-	6755

a. 1000 reels/40 sq. ft.
b. 2-Day Supply
c. 8 Sq. Ft./File
d. 30-60 Day Supply

TABLE 35

WAREHOUSE, GARAGE, MAINTENANCE CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Warehouse			
1. Warehouse - Superintendent's Office	100	100	100
2. Central Warehouse	3500	5250	7000
3. Men's Locker Room	160	160	160
4. Shipping & Receiving Area	150	250	250
Warehouse Sub-Total	3910	5760	7510
Garage			
5. Garage Superintendent's Office	100	100	100
6. Dispatcher's Office	-	100	100
7. Mechanic's Lockers	100	160	200
8. Storage Garage	1800	2800	3000
9. Repair Shop	200	400	800
Garage Sub-Total	2200	3560	4200
Maintenance			
10. Foremen's Offices	100	(2) 200	(3) 300
11. Men's Locker Room	160	160	160
12. Women's Locker Room	140	140	140
13. Repair Shop[a]	1000	2000	2800
14. Paint Shop	-	250	250
15. Electric Shop	-	250	250
16. Gardening Workroom & Storage	500	1000	1000
17. Security Guard's Office	-	100	100
18. Security Guard's Locker	100	100	100

TABLE 35 (Continued)

Enrollment Level FTE Students	I 2800	II 3500	III 6000
Maintenance (Continued)			
19. Incinerator	100	100	100
Maintenance Sub-Total	2100	4300	5200
Warehouse, Garage, Maintenance Center Total	8210	13,620	16,910

a. Metal & Carpentry.

4. Facility Relationships

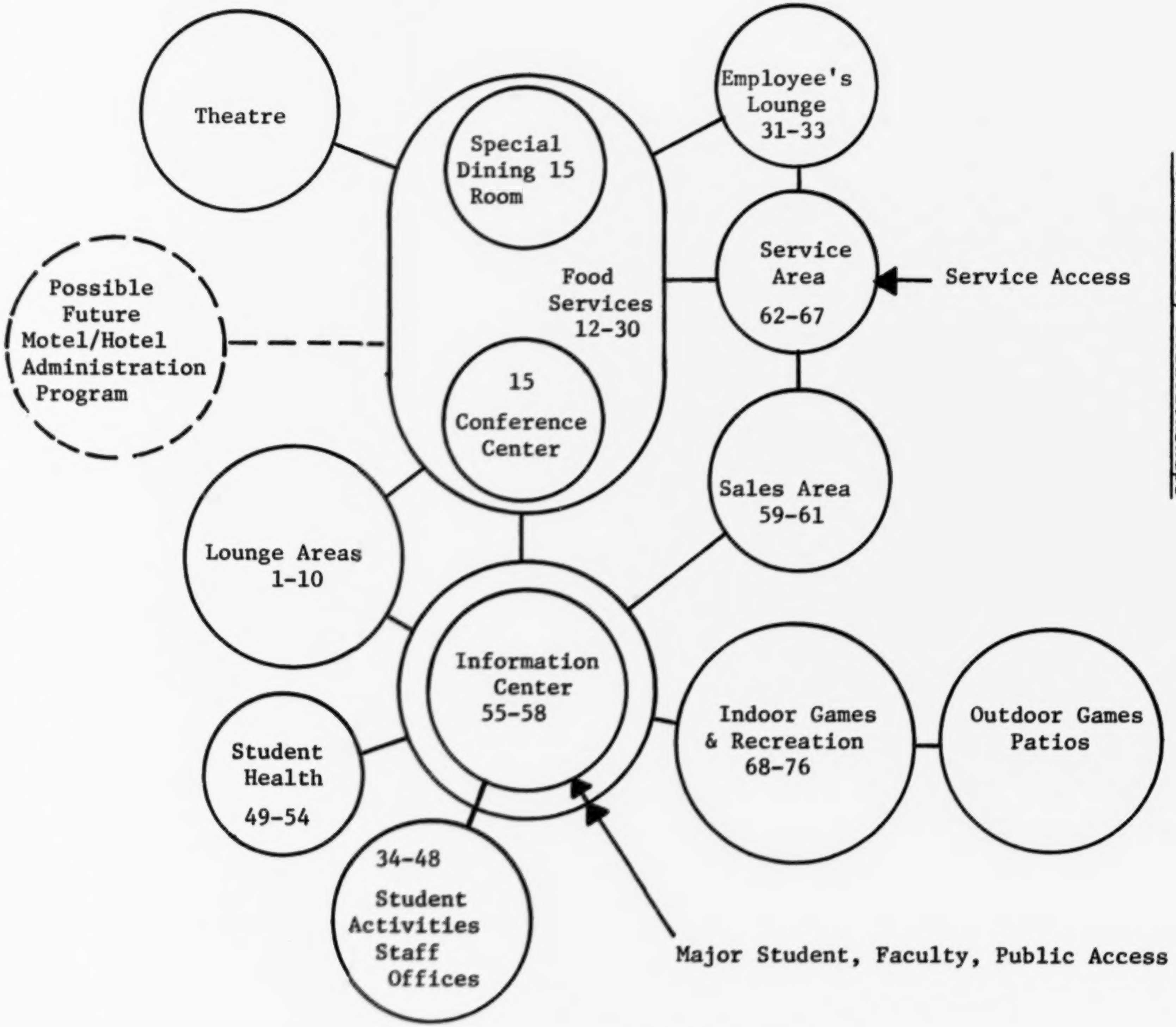

Theatre
Special Dining 15 Room
Food Services 12-30
15 Conference Center
Possible Future Motel/Hotel Administration Program
Employee's Lounge 31-33
Service Area 62-67
Service Access
Sales Area 59-61
Lounge Areas 1-10
Information Center 55-58
Indoor Games & Recreation 68-76
Outdoor Games Patios
Student Health 49-54
34-48 Student Activities Staff Offices
Major Student, Faculty, Public Access

FIGURE 6 COLLEGE UNION
(See Table 29)

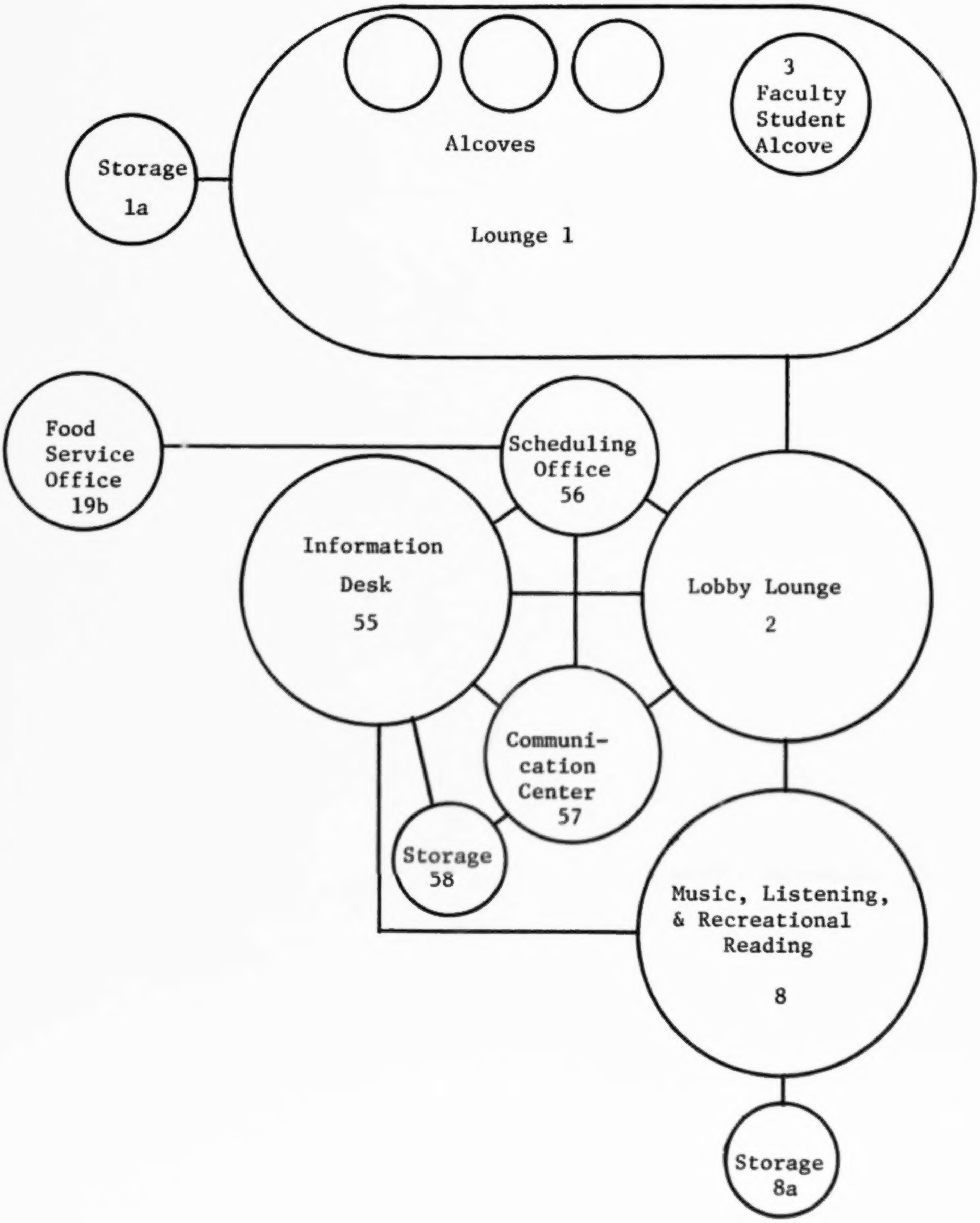

3
Faculty
Student
Alcove
Alcoves
Storage
1a
Lounge 1
Food
Service
Office
19b
Scheduling
Office
56
Information
Desk
55
Lobby Lounge
2
Communi-
cation
Center
57
Storage
58
Music, Listening,
& Recreational
Reading
8
Storage
8a

FIGURE 7 COLLEGE UNION - LOUNGE AREAS
(See Table 29)

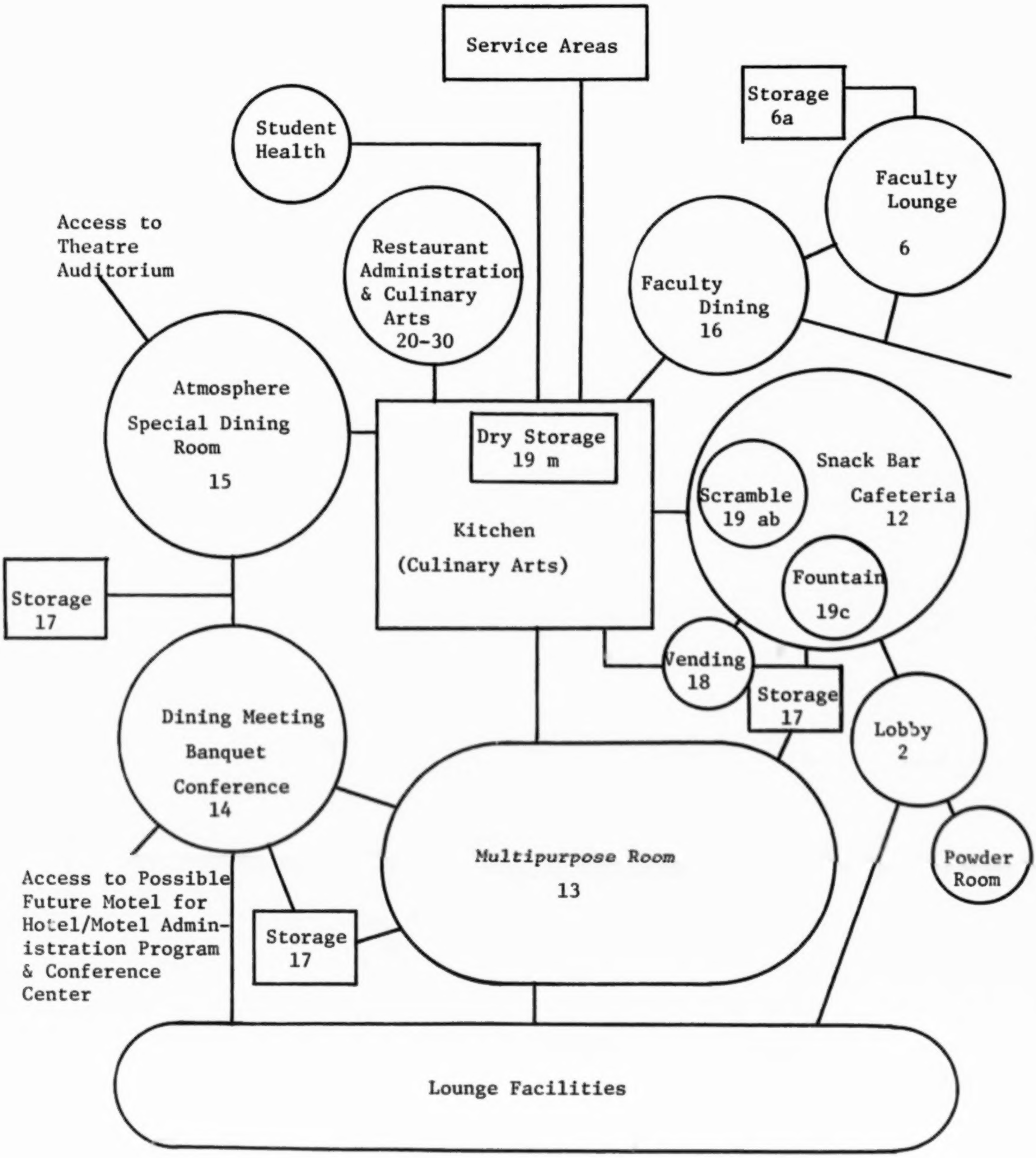

Service Areas
Storage 6a
Student Health
Faculty Lounge 6
Access to Theatre Auditorium
Restaurant Administratio & Culinary Arts 20-30
Faculty Dining 16
Atmosphere Special Dining Room 15
Dry Storage 19 m
Kitchen (Culinary Arts)
Snack Bar Cafeteria 12
Scramble 19 ab
Fountai 19c
Storage 17
Vending 18
Storage 17
Lobby 2
Dining Meeting Banquet Conference 14
Multipurpose Room 13
Powder Room
Access to Possible Future Motel for Hotel/Motel Administration Program & Conference Center
Storage 17
Lounge Facilities

FIGURE 8 COLLEGE UNION -- FOOD SERVICE AND RELATED AREAS
(See Table 29)

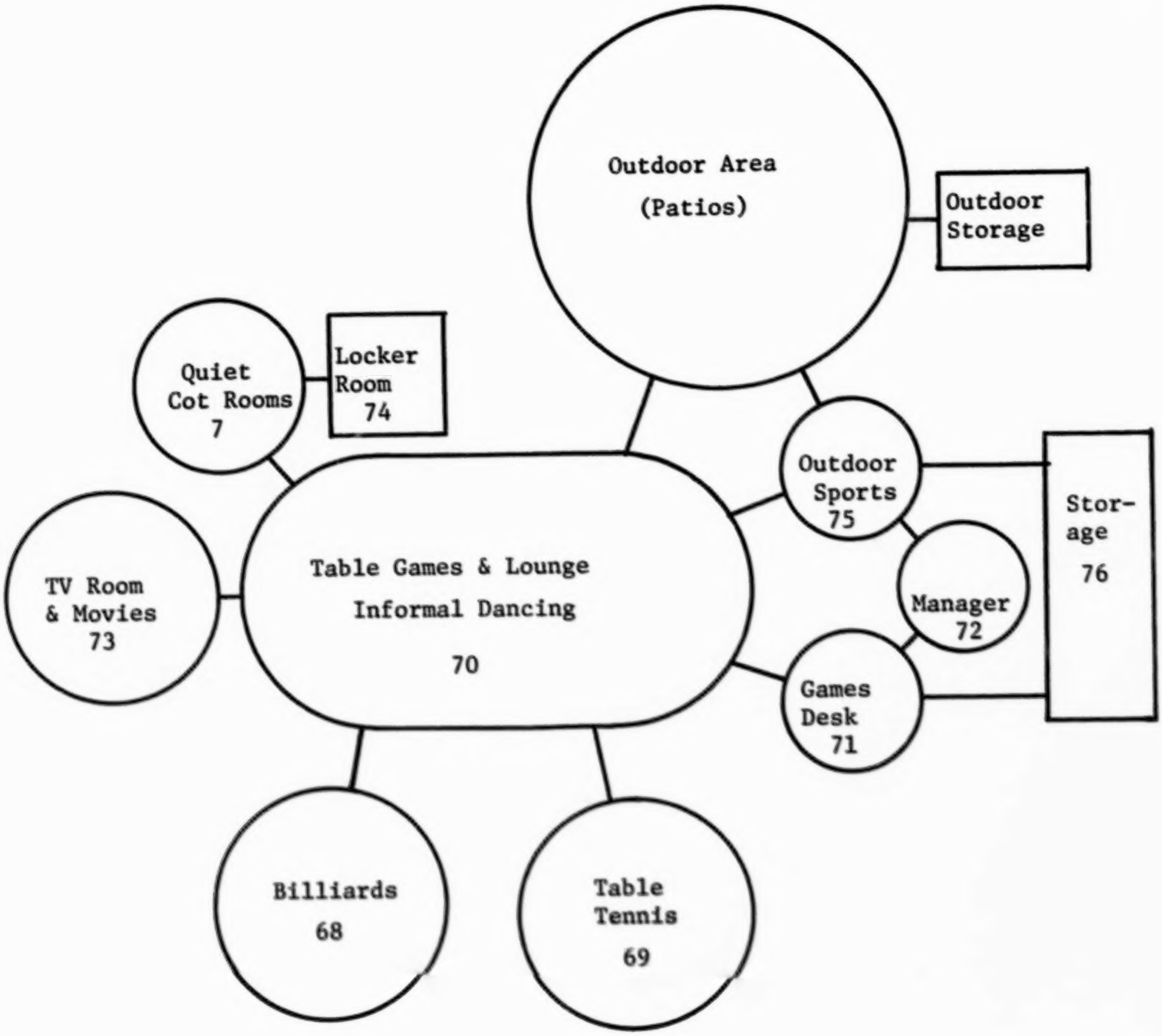

Outdoor Area
(Patios)
Outdoor Storage
Quiet Cot Rooms 7
Locker Room 74
Outdoor Sports 75
Stor-age 76
TV Room & Movies 73
Table Games & Lounge
Informal Dancing
70
Manager 72
Games Desk 71
Billiards 68
Table Tennis 69

FIGURE 9 COLLEGE UNION - GAMES AND RECREATIONAL AREAS
(See Table 29)

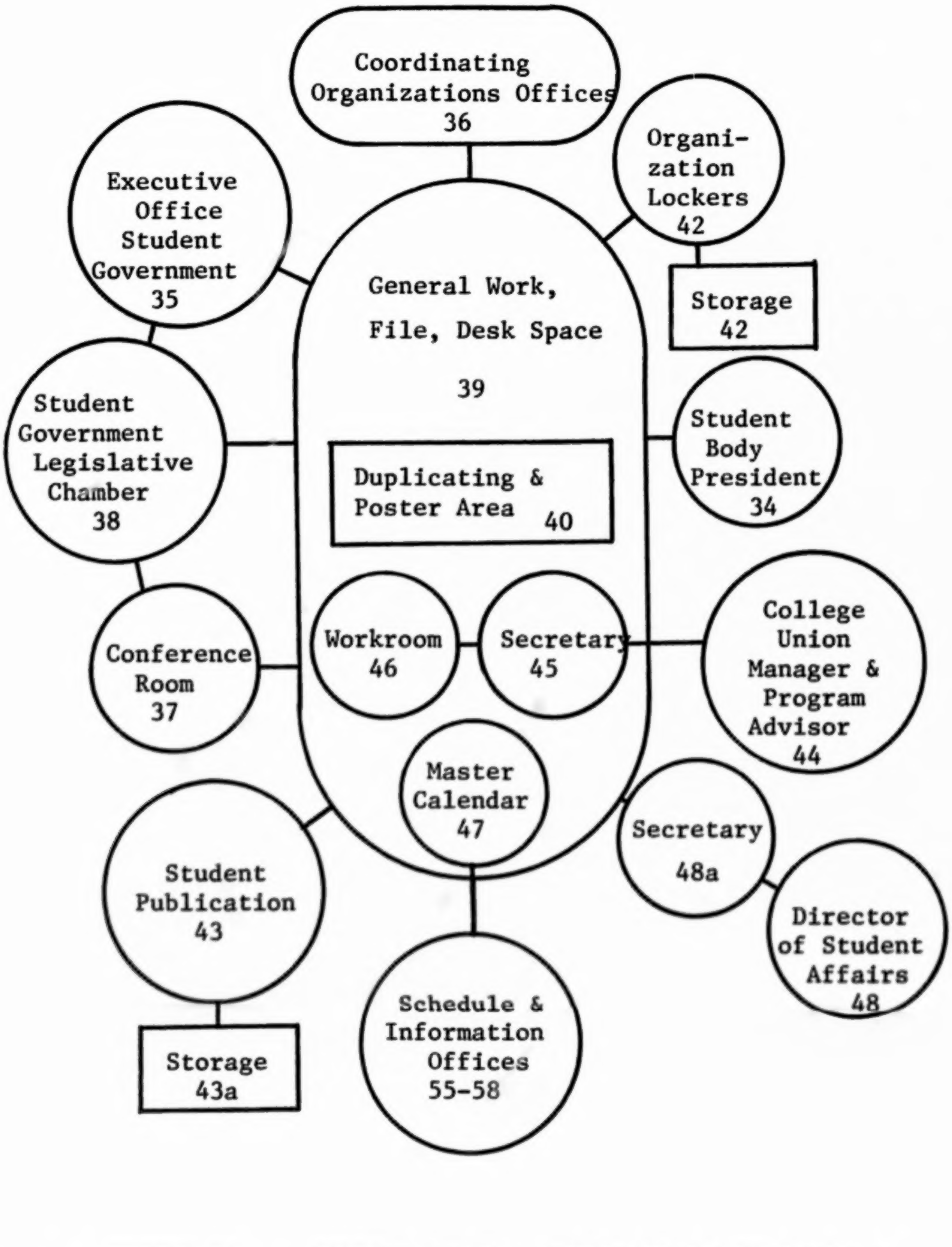

Coordinating Organizations Offices 36
Organization Lockers 42
Storage 42
Executive Office Student Government 35
General Work, File, Desk Space 39
Student Government Legislative Chamber 38
Duplicating & Poster Area 40
Student Body President 34
Conference Room 37
Workroom 46
Secretary 45
College Union Manager & Program Advisor 44
Master Calendar 47
Secretary 48a
Student Publication 43
Director of Student Affairs 48
Storage 43a
Schedule & Information Offices 55-58

FIGURE 10 COLLEGE UNION - HEADQUARTERS OF STUDENT ACTIVITIES AND STAFF OFFICES
(See Table 29)

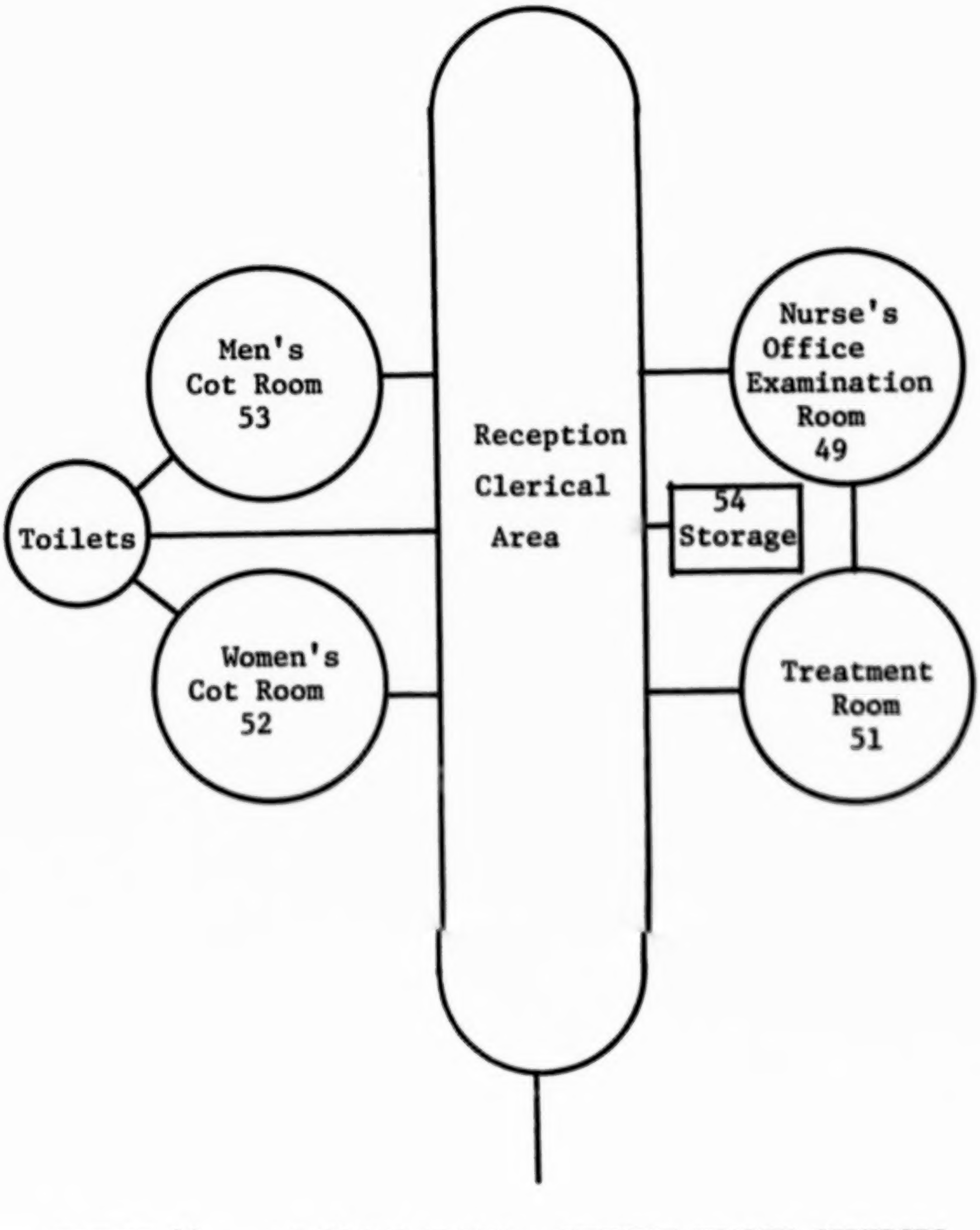

Men's Cot Room 53
Toilets
Women's Cot Room 52
Reception Clerical Area
Nurse's Office Examination Room 49
54 Storage
Treatment Room 51

FIGURE 11 COLLEGE UNION - STUDENT HEALTH SERVICES (See Table 29)

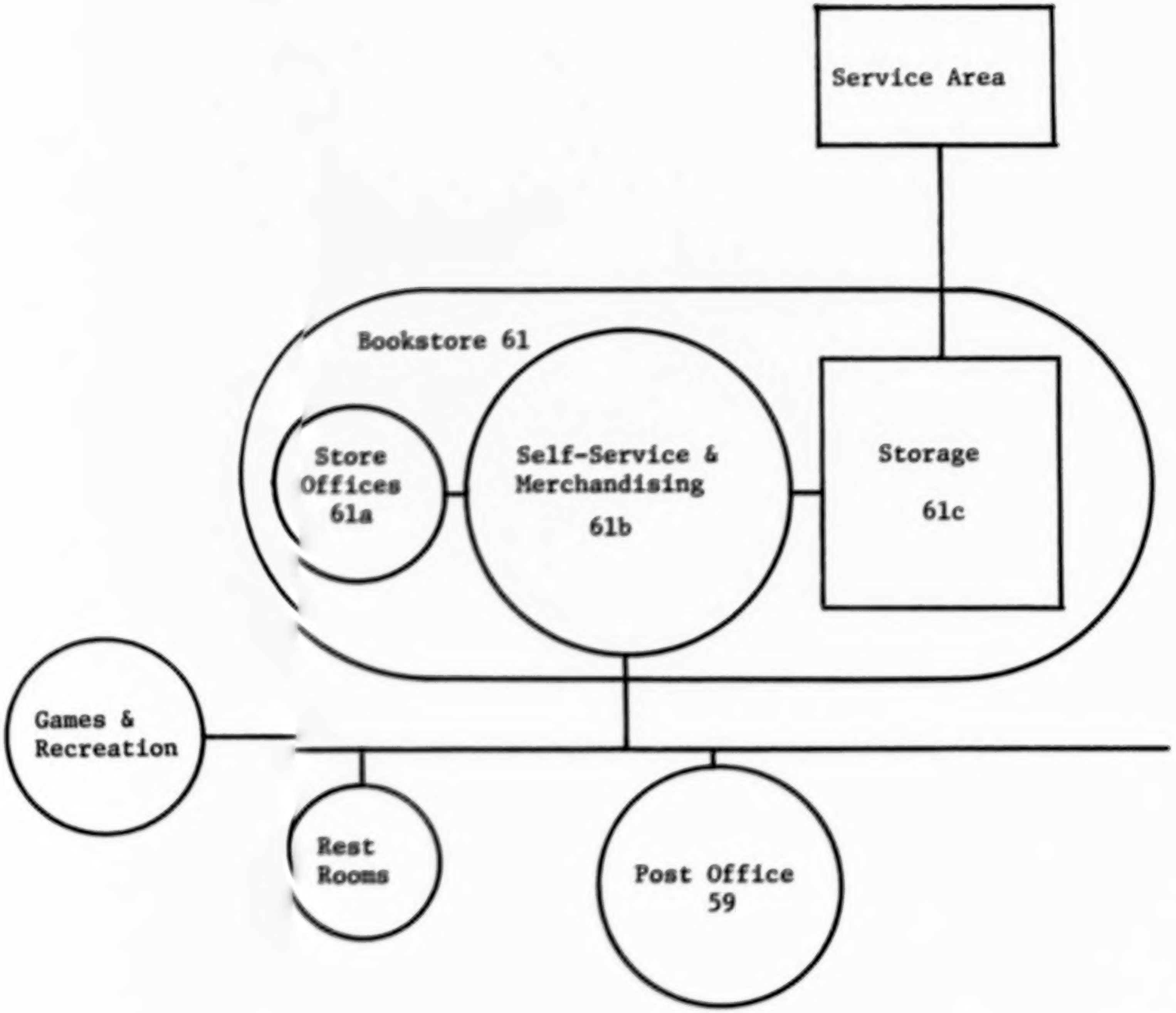

Service Area
Bookstore 61
Store Offices 61a
Self-Service & Merchandising 61b
Storage 61c
Games & Recreation
Rest Rooms
Post Office 59

FIGURE 12 COLLEGE UNION - SALES AREA
(See Table 29)

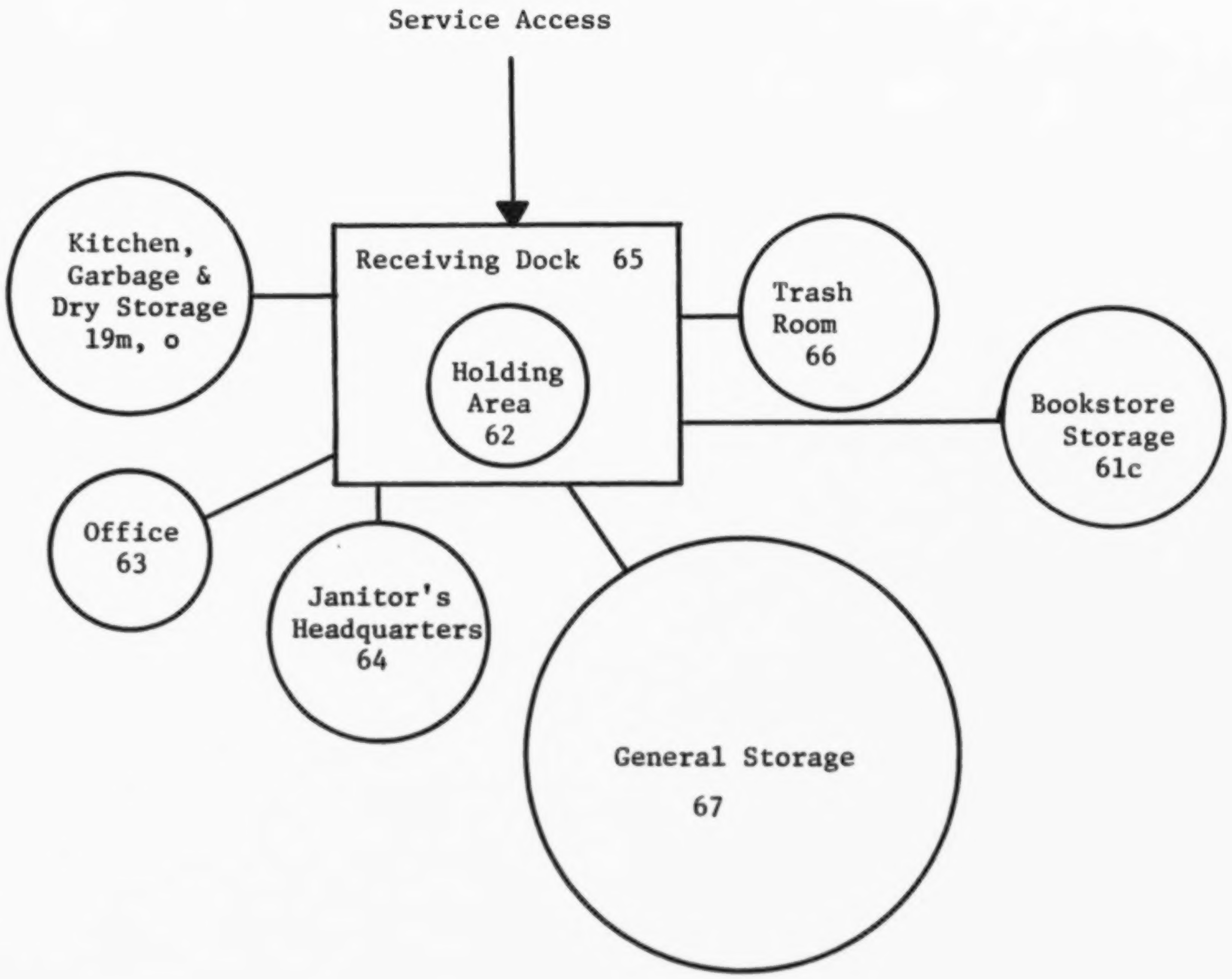

Service Access
Receiving Dock 65
Holding Area 62
Kitchen, Garbage & Dry Storage 19m, o
Trash Room 66
Bookstore Storage 61c
Office 63
Janitor's Headquarters 64
General Storage 67

FIGURE 13 COLLEGE UNION - SERVICE AREAS
(See Table 29)

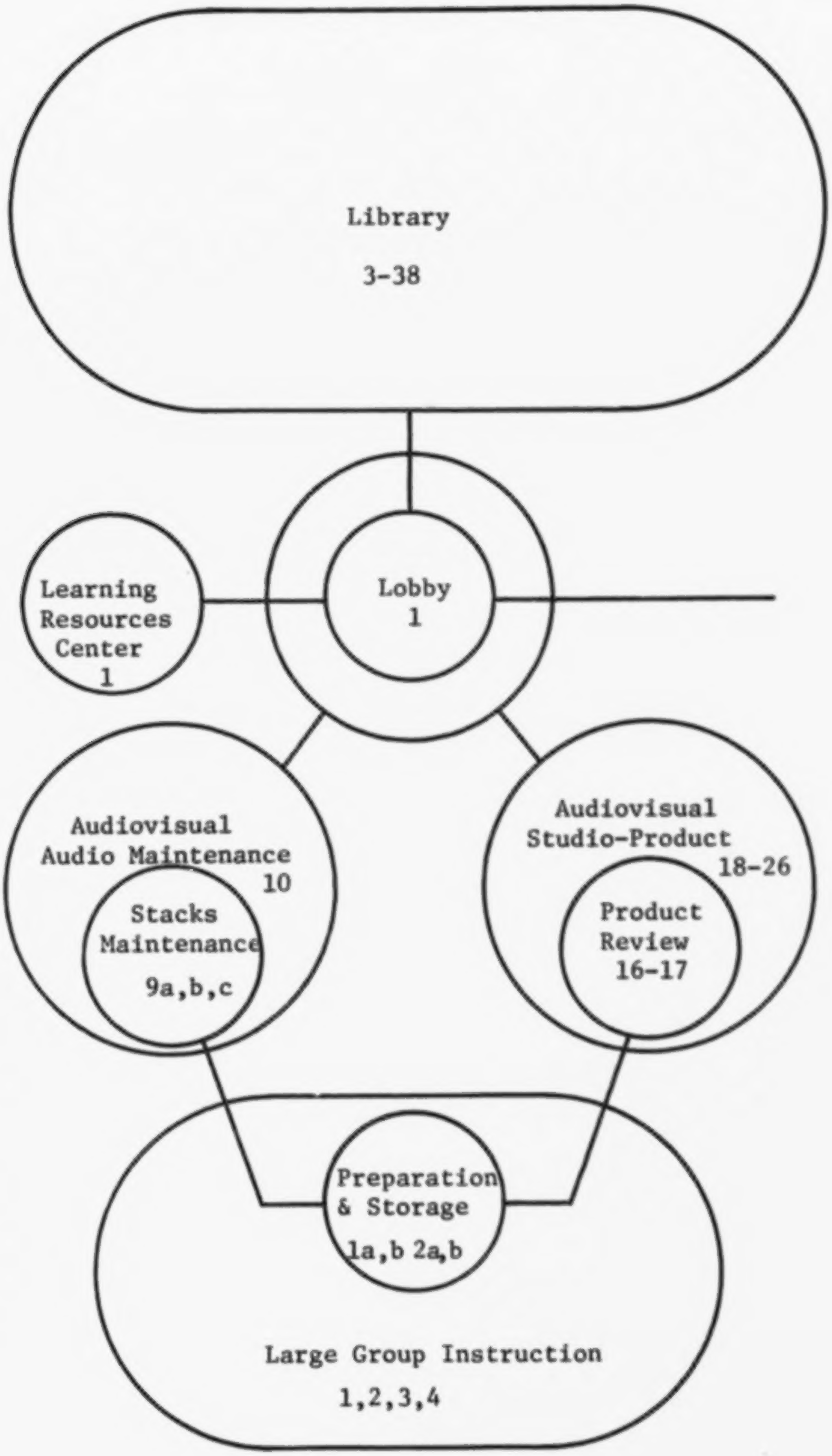

Library
3-38
Learning
Resources
Center
1
Lobby
1
Audiovisual
Audio Maintenance
10
Stacks
Maintenance
9a,b,c
Audiovisual
Studio-Product
18-26
Product
Review
16-17
Preparation
& Storage
1a,b 2a,b
Large Group Instruction
1,2,3,4

FIGURE 14 LEARNING RESOURCES CENTER
(See Table 28)

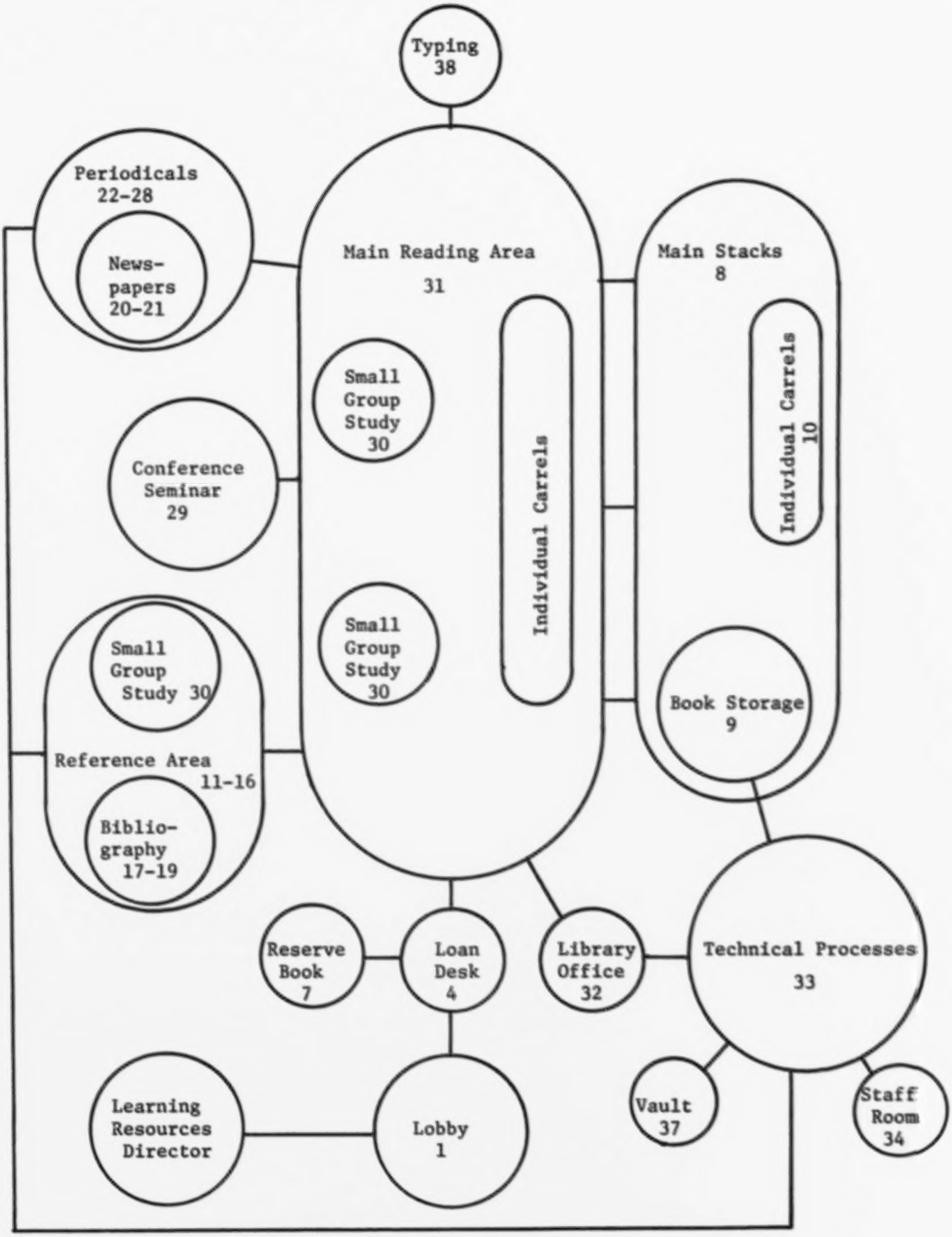

Typing
38
Periodicals
22-28
News-
papers
20-21
Main Reading Area
31
Main Stacks
8
Small
Group
Study
30
Individual Carrels
Individual Carrels
10
Conference
Seminar
29
Small
Group
Study
30
Small
Group
Study 30
Reference Area
11-16
Bibliog-
graphy
17-19
Book Storage
9
Reserve
Book
7
Loan
Desk
4
Library
Office
32
Technical Processes
33
Vault
37
Staff
Room
34
Learning
Resources
Director
Lobby
1

FIGURE 15 LEARNING RESOURCES CENTER - LIBRARY
(See Table 28)

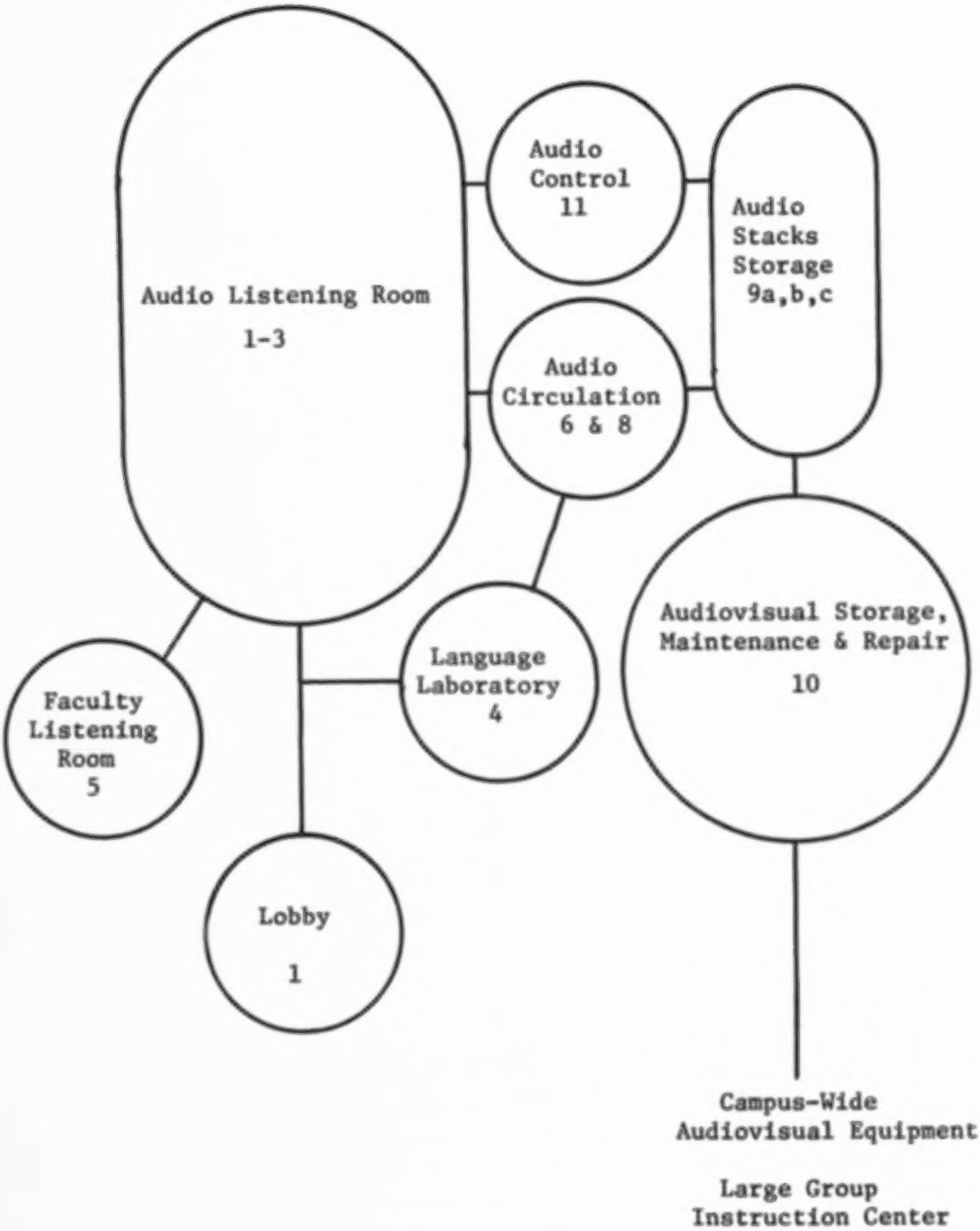

Audio Listening Room
1-3
Audio
Control
11
Audio
Stacks
Storage
9a,b,c
Audio
Circulation
6 & 8
Language
Laboratory
4
Audiovisual Storage,
Maintenance & Repair
10
Faculty
Listening
Room
5
Lobby
1
Campus-Wide
Audiovisual Equipment
Large Group
Instruction Center

FIGURE 16 LEARNING RESOURCES CENTER - AUDIOVISUAL
(See Table 28)

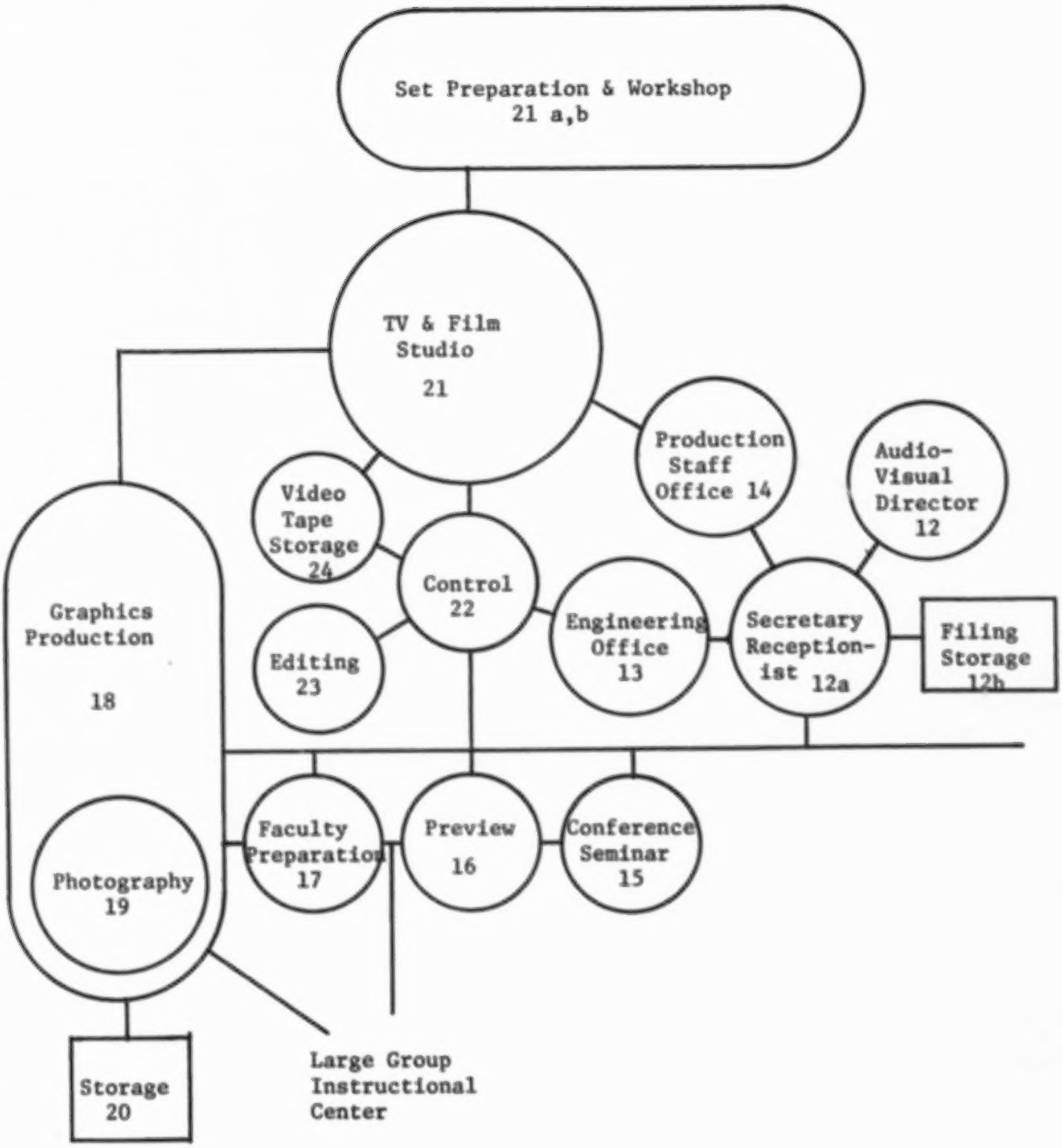

Set Preparation & Workshop
21 a,b
TV & Film Studio
21
Production Staff Office 14
Audio-Visual Director
12
Video Tape Storage
24
Control
22
Graphics Production
18
Editing
23
Engineering Office
13
Secretary Reception-ist 12a
Filing Storage
12b
Faculty Preparation
17
Preview
16
Conference Seminar
15
Photography
19
Storage
20
Large Group Instructional Center

FIGURE 17 LEARNING RESOURCES CENTER - AUDIOVISUAL STUDIOS PRODUCTION
(See Table 28)

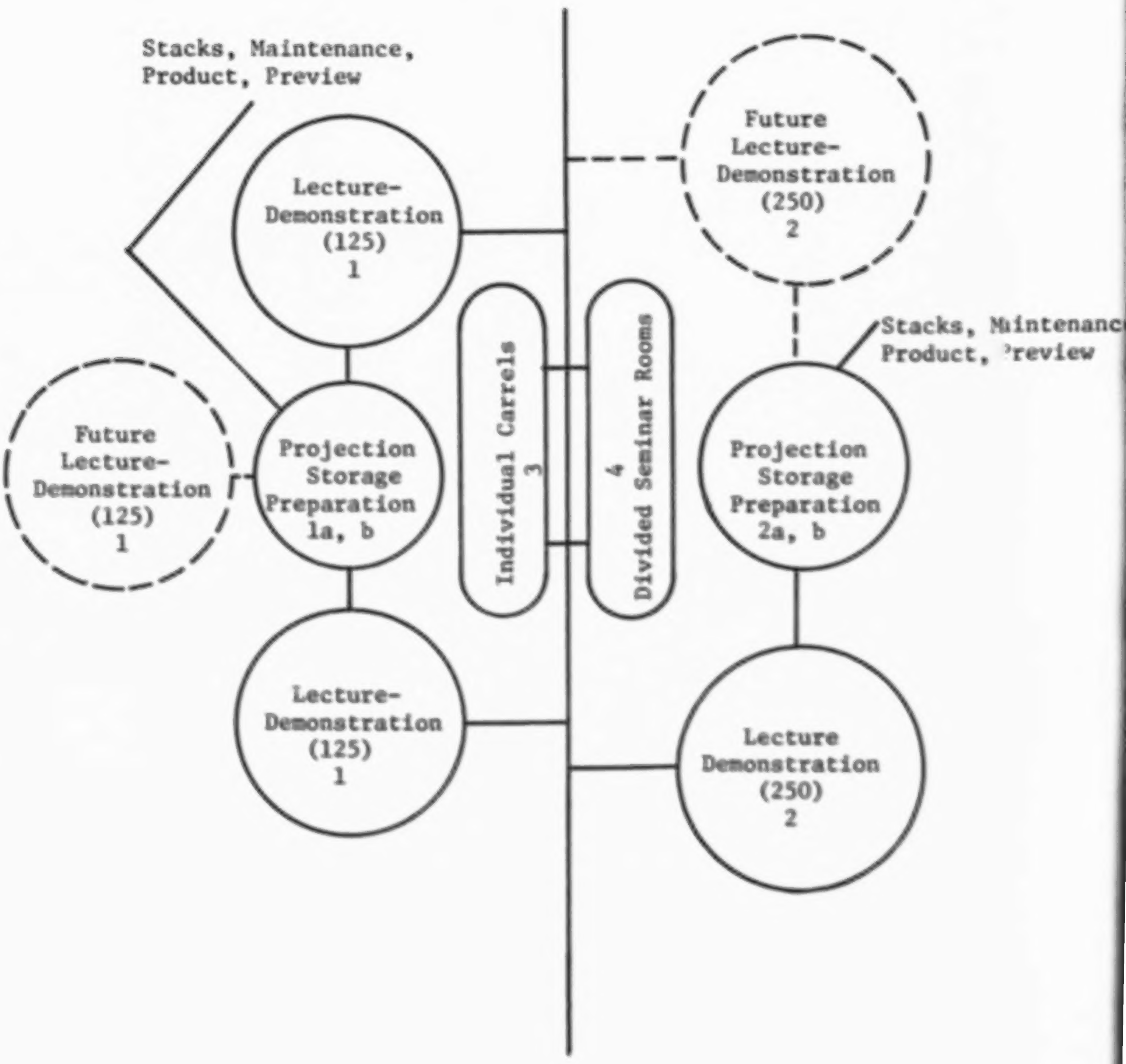

Stacks, Maintenance,
Product, Preview
Lecture-
Demonstration
(125)
1
Future
Lecture-
Demonstration
(250)
2
Stacks, Maintenanc
Product, Preview
Future
Lecture-
Demonstration
(125)
1
Projection
Storage
Preparation
1a, b
Individual Carrels
3
4
Divided Seminar Rooms
Projection
Storage
Preparation
2a, b
Lecture-
Demonstration
(125)
1
Lecture
Demonstration
(250)
2

FIGURE 18 LARGE GROUP INSTRUCTIONAL CENTER
(See Table 23)

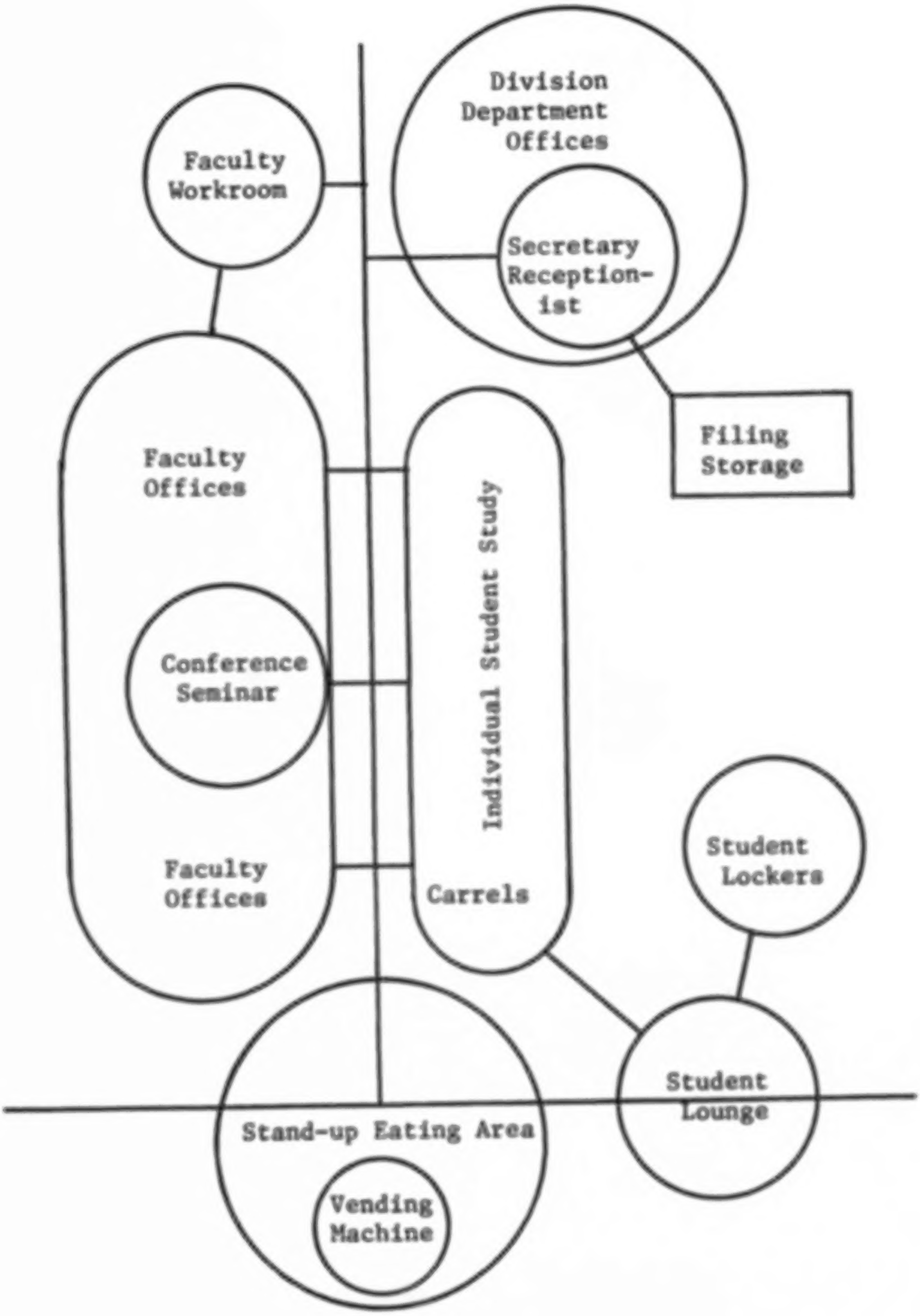

Division
Department
Offices
Faculty
Workroom
Secretary
Receptionist
Filing
Storage
Faculty
Offices
Individual Student Study
Conference
Seminar
Faculty
Offices
Carrels
Student
Lockers
Student
Lounge
Stand-up Eating Area
Vending
Machine

FIGURE 19 DIVISION CENTER
(See Tables 19, 20, 22, 24, 25 and 26)

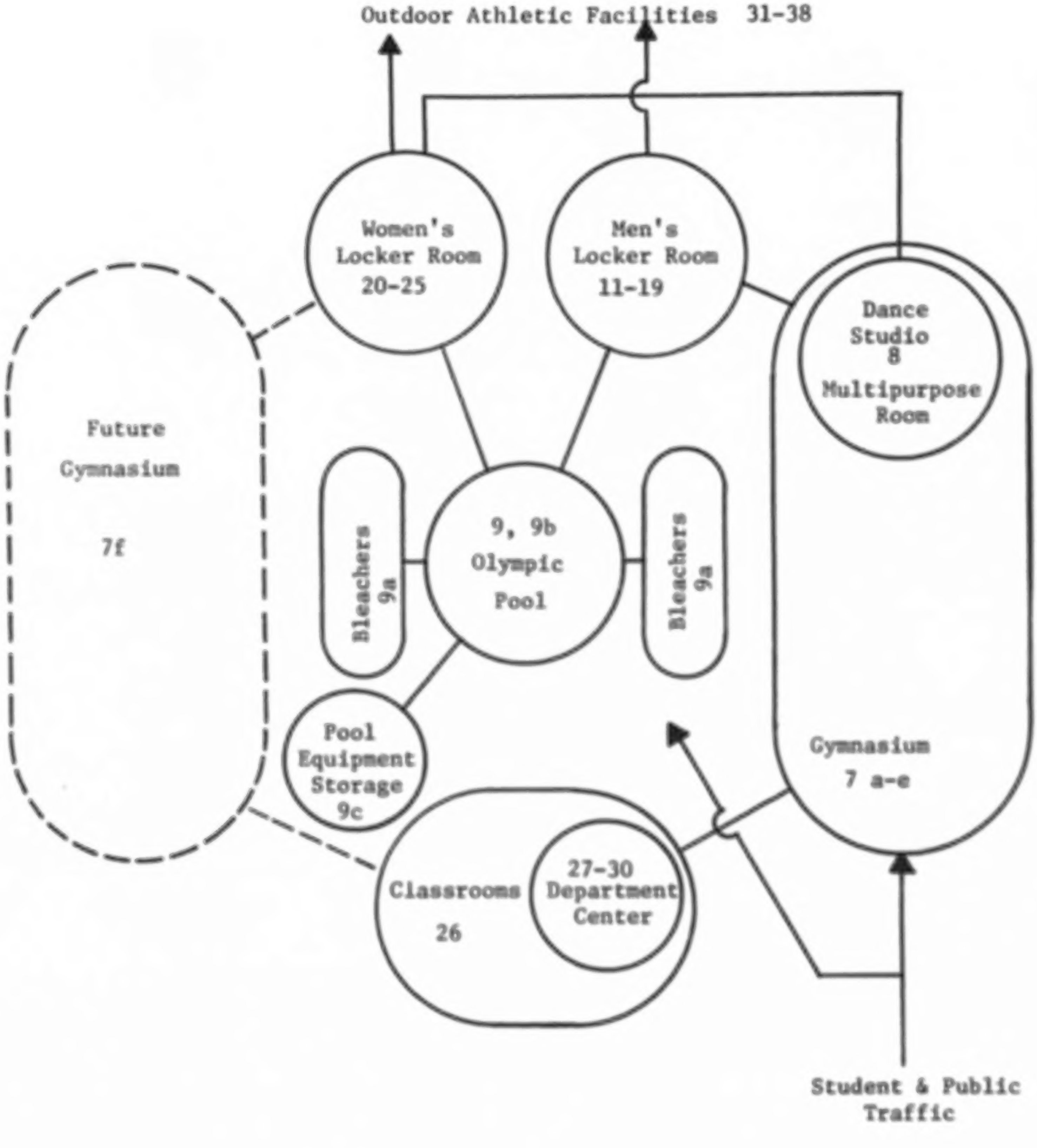

Outdoor Athletic Facilities 31-38
Women's Locker Room 20-25
Men's Locker Room 11-19
Future Gymnasium 7f
Dance Studio 8
Multipurpose Room
Bleachers 9a
9, 9b Olympic Pool
Bleachers 9a
Pool Equipment Storage 9c
Gymnasium 7 a-e
Classrooms 26
27-30 Department Center
Student & Public Traffic

FIGURE 20 PHYSICAL EDUCATION

(See Table 27)

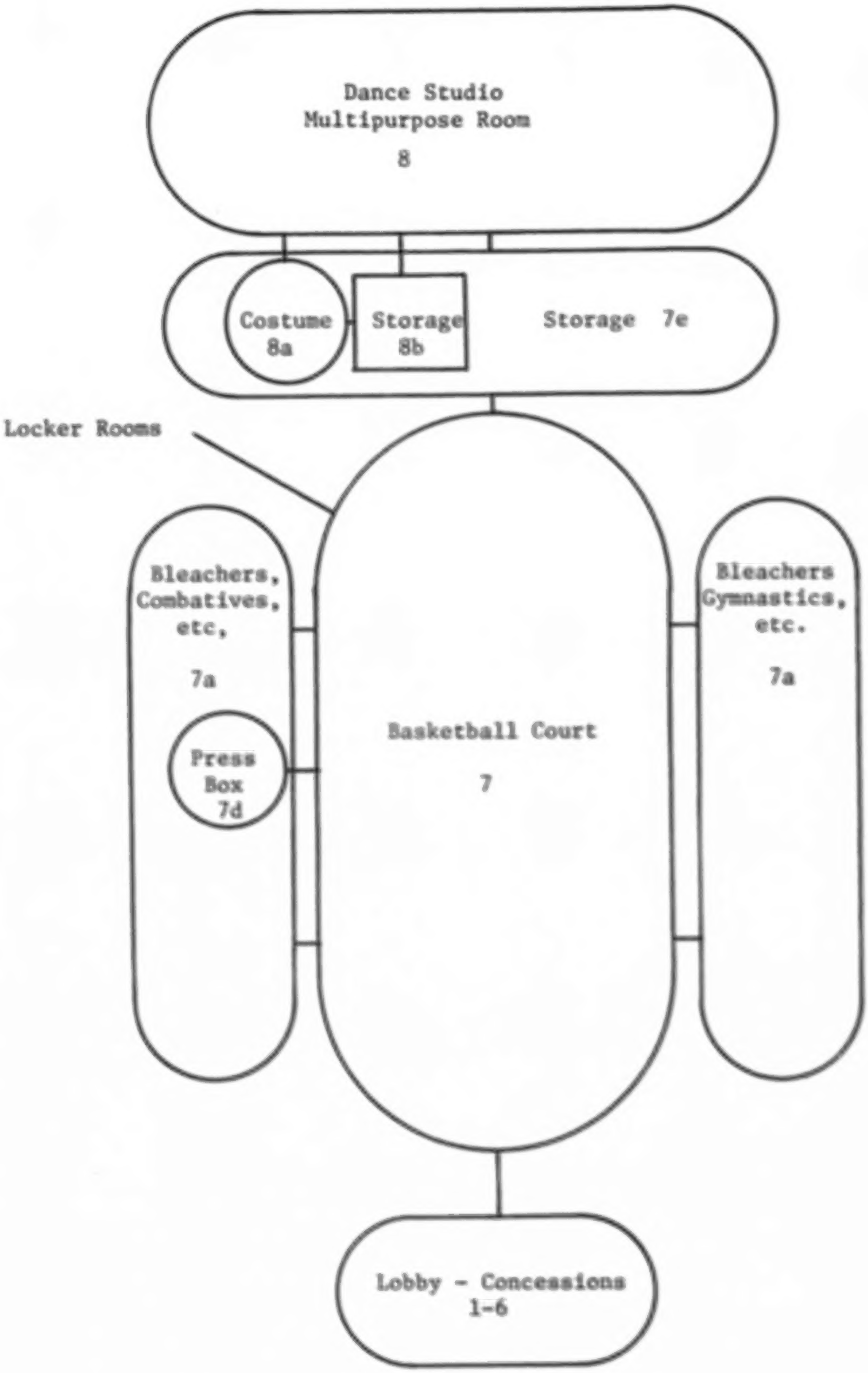

Dance Studio
Multipurpose Room
8
Costume
8a
Storage
8b
Storage 7e
Locker Rooms
Bleachers,
Combatives,
etc,
7a
Press
Box
7d
Basketball Court
7
Bleachers
Gymnastics,
etc.
7a
Lobby - Concessions
1-6

FIGURE 21 PHYSICAL EDUCATION FACILITIES - MEN'S (MAIN) GYMNASIUM
(See Table 27)

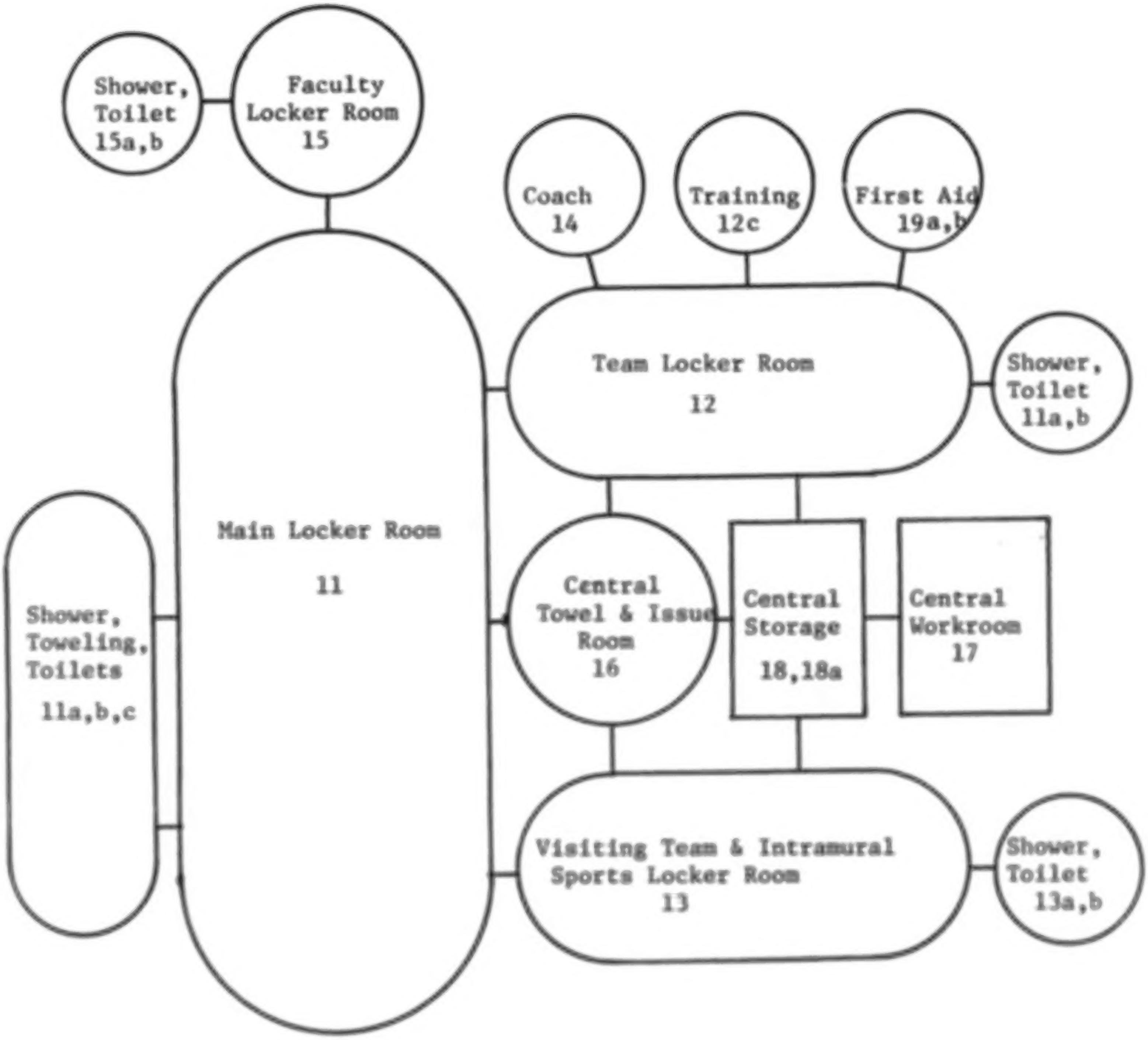

Shower,
Toilet
15a,b
Faculty
Locker Room
15
Coach
14
Training
12c
First Aid
19a,b
Team Locker Room
12
Shower,
Toilet
11a,b
Main Locker Room
11
Shower,
Toweling,
Toilets
11a,b,c
Central
Towel & Issue
Room
16
Central
Storage
18,18a
Central
Workroom
17
Visiting Team & Intramural
Sports Locker Room
13
Shower,
Toilet
13a,b

FIGURE 22 PHYSICAL EDUCATION FACILITIES - MEN'S LOCKER ROOM
(See Table 27)

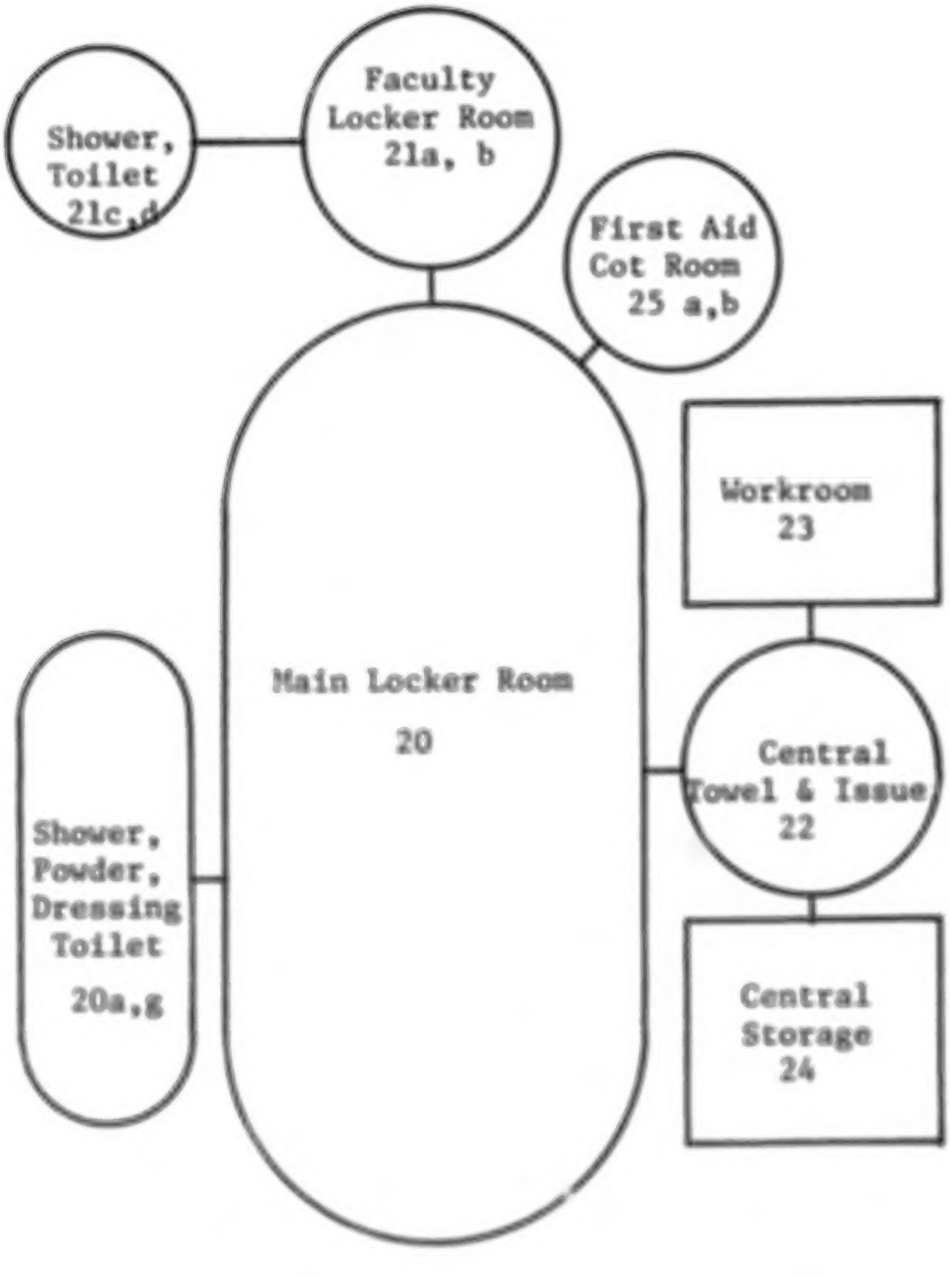

Shower,
Toilet
21c,d
Faculty
Locker Room
21a, b
First Aid
Cot Room
25 a,b
Workroom
23
Main Locker Room
20
Central
Towel & Issue
22
Shower,
Powder,
Dressing
Toilet
20a,g
Central
Storage
24

FIGURE 23 PHYSICAL EDUCATION FACILITIES - WOMEN'S LOCKER ROOM
(See Table 27)

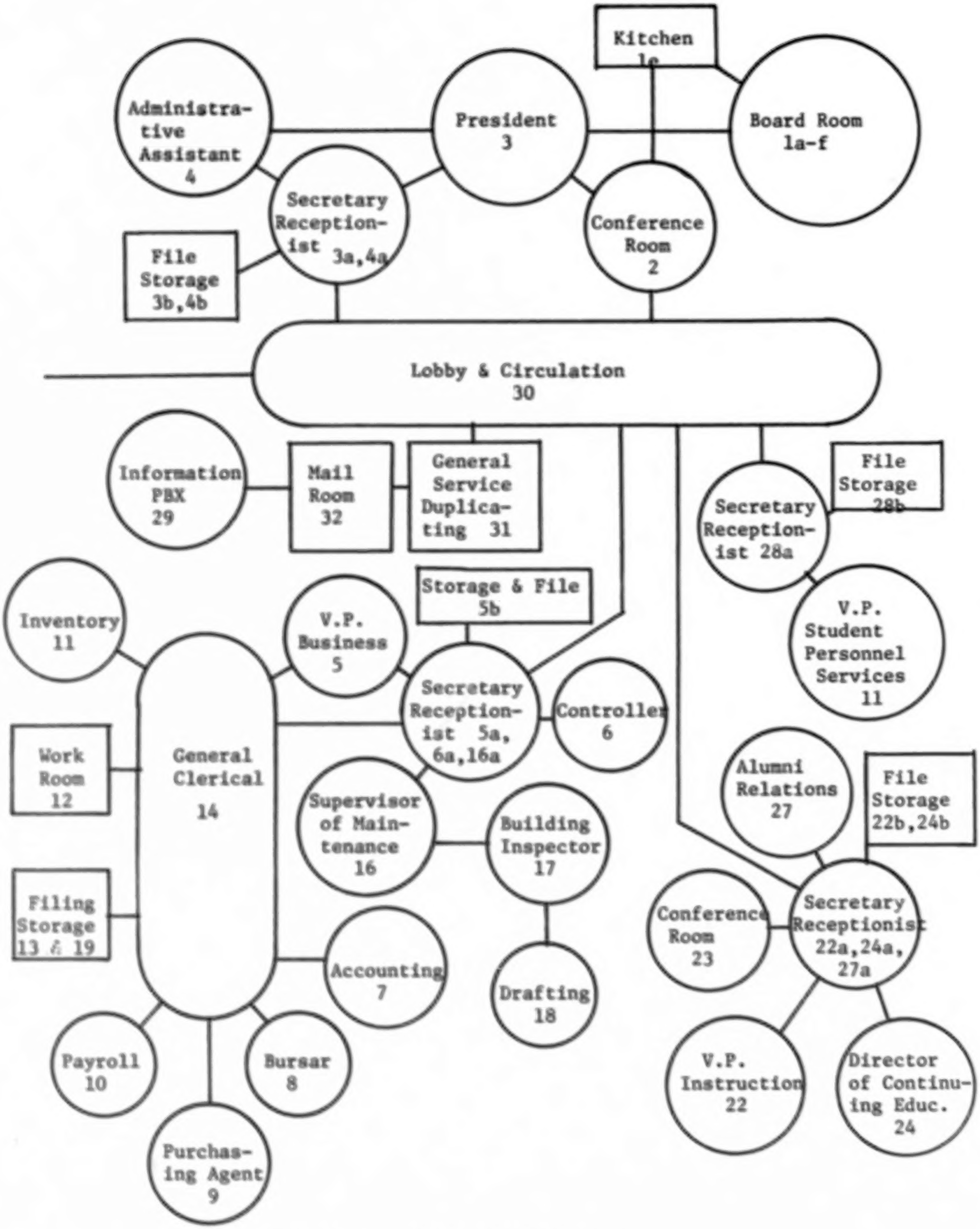

Kitchen
1e
Administrative Assistant
4
President
3
Board Room
1a-f
Secretary Receptionist
3a,4a
Conference Room
2
File Storage
3b,4b
Lobby & Circulation
30
Information PBX
29
Mail Room
32
General Service Duplicating 31
File Storage
28b
Secretary Receptionist 28a
V.P. Student Personnel Services
11
Storage & File
5b
Inventory
11
V.P. Business
5
Secretary Receptionist 5a, 6a,16a
Controller
6
Work Room
12
General Clerical
14
Supervisor of Maintenance
16
Building Inspector
17
Alumni Relations
27
File Storage
22b,24b
Filing Storage
13 & 19
Accounting
7
Drafting
18
Conference Room
23
Secretary Receptionist
22a,24a,
27a
Payroll
10
Bursar
8
V.P. Instruction
22
Director of Continuing Educ.
24
Purchasing Agent
9

FIGURE 24 ADMINISTRATION CENTER
(See Table 31)

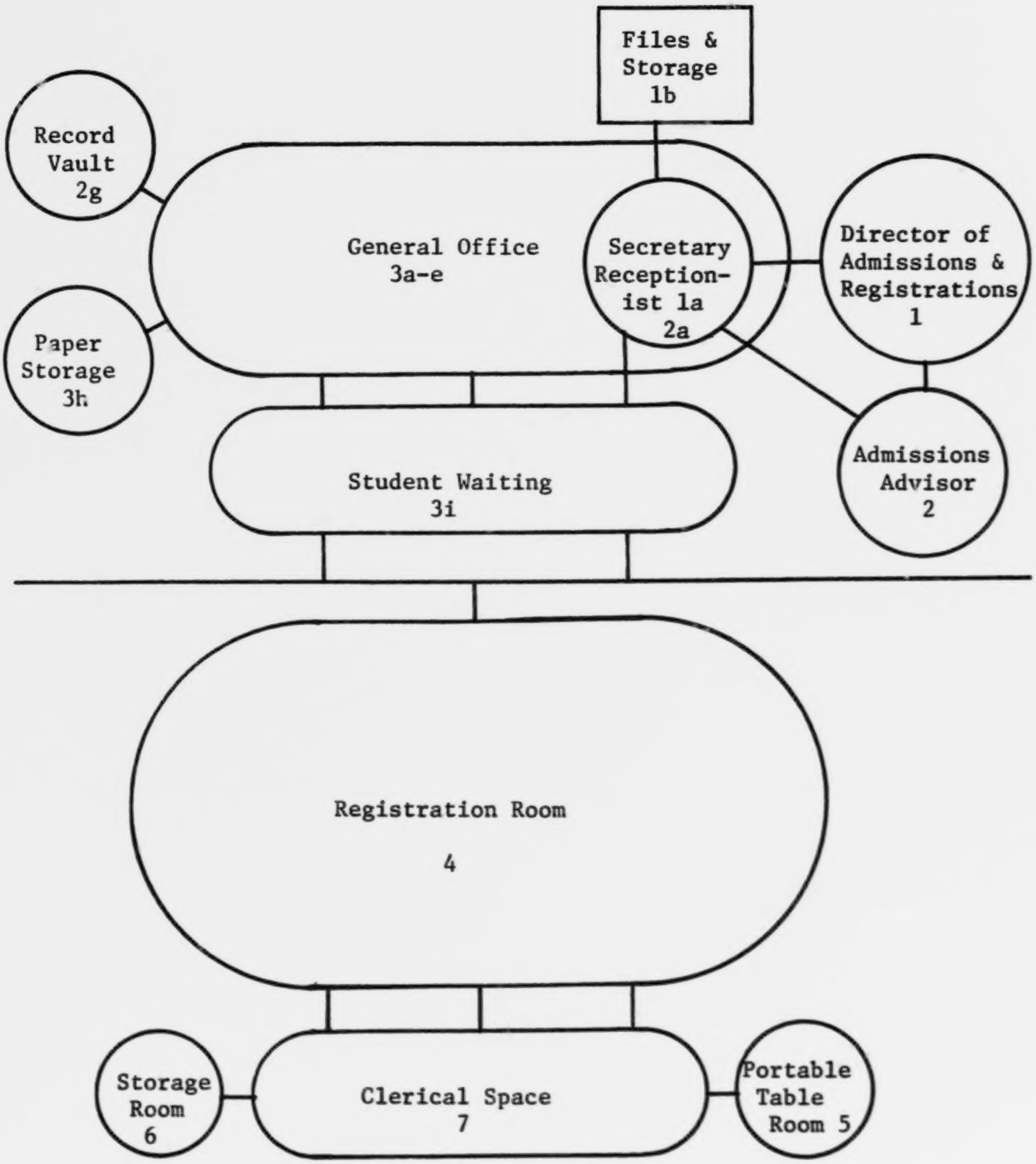

Files &
Storage
1b
Record
Vault
2g
General Office
3a-e
Secretary
Reception-
ist 1a
2a
Director of
Admissions &
Registrations
1
Paper
Storage
3h
Student Waiting
3i
Admissions
Advisor
2
Registration Room
4
Storage
Room
6
Clerical Space
7
Portable
Table
Room 5

FIGURE 25 REGISTRATION AND ADMISSIONS CENTER
(See Table 32)

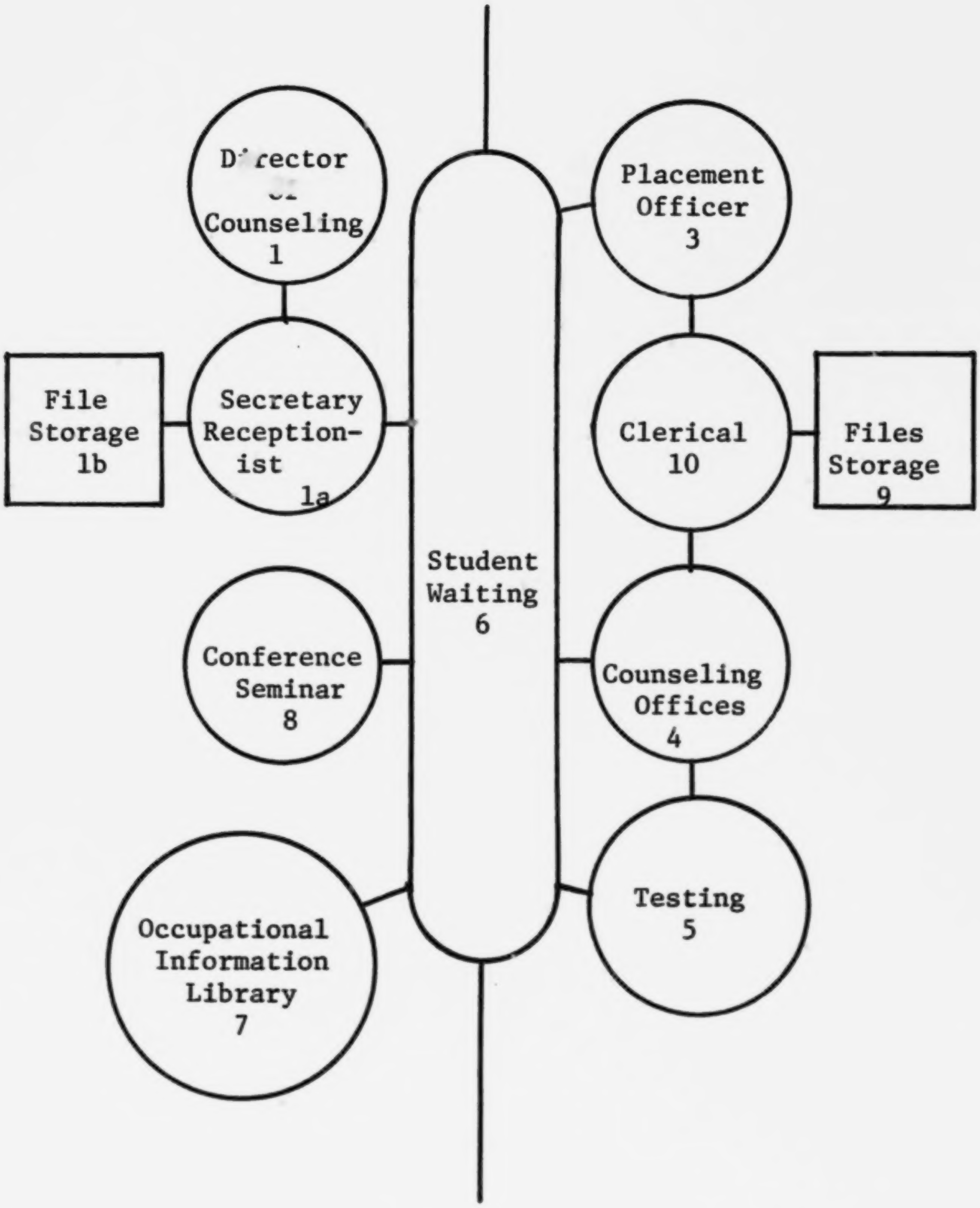

Director of Counseling 1
Secretary Reception-ist 1a
File Storage 1b
Placement Officer 3
Clerical 10
Files Storage 9
Student Waiting 6
Conference Seminar 8
Counseling Offices 4
Testing 5
Occupational Information Library 7

FIGURE 26 COUNSELING CENTER
(See Table 33)

5. Planning Assumptions and Standards

(a.) Learning Resources Planning Criteria

1. Library

(a) Volumes

Book Collection: ALA standards for Junior Colleges plus 10% allowance for duplicates and other.

(b) Periodicals

1. Distribute 200 (ALA minimum) to 600 periodicals over three enrollment levels; 4.8% (Community College Library, Wheeler) of colleges have over 200; College of San Mateo has 600 periodicals.

2. Bound Periodicals: 1.5 volume per title per year, one-third of titles retained to 5-year (ALA and Bakersfield questionnaire) period plus index.

3. Microfilm Periodicals: two-thirds of the titles are microfilmed each year after first level; in second and third enrollment levels the final third is picked up for microfilming.

4. Microfilm readers: In a sample of 19 California junior colleges, the ratio varied from 1/10,000 to 1/550 students. Use: San Mateo experience - 1/1600 head count students, 1/400 reels.

(c) Newspapers

Newspapers are assumed to be bound for a two-year period, after which they are microfilmed.

(d) Reader Stations

Library Reader Stations: EFL study of student study patterns in community colleges found that in commuter colleges approximately 10% of the head count students utilize the library for study. Assuming FTE to be 80% of head count students, this would be 12.5% of the FTE students. The ALA standard for community colleges recommends 25% of the FTE students be accomodated in reader stations. For purposes of our calculations we have taken a slightly higher than a middle road between these percentages : Phase I - 18%; Phase II - 20%; Phase III - 18%.

Other Reader Stations: 5% of FTE students in each level distributed in each Division Center.

2. Audiovisual

(a) Student Distribution (based on College of San Mateo experience).
Tapes (2,000 to 6,000 students) use .5 per head count student
Records (2,000 to 6,000 students) use 1.5 per head count student

(b) Faculty Distribution - based where possible on Department of Audio-Visual Instruction, National Education Association (NEA) Quantitative Standards.

Film - 16 mm

Slides (based on San Mateo experience)

Other (estimated total space) includes 8 mm film, 2x2, 3-1/4x4 slides, study prints, maps, globes, dioramas.

(c) Equipment - based on Department of Audio-Visual Instruction, NEA Standards.

TABLE 36

PIMA COLLEGE

DISTRIBUTION OF LIBRARY - LEARNING RESOURCES CENTER

READER STATIONS

Enrollment Level			I			II			III		
FTE Students			2800			3500			6000		
Reader Stations			504(18%)			700(20%)			1080(18%)		
Area	Type of Reader Station	Sq.Ft. Station	No.	%	SF	No.	%	SF	No.	%	SF
Lobby-Lounge	Lounge Furn.	40	16	3.1	640	16	2.1	640	20	1.9	800
Open Stacks	B Carrels	25	16	3.1	400	16	2.1	400	40	3.7	1000
Reading Area	Table Chairs	25	202	40.0	5050	308	44.0	7700	437	40.5	10925
Reference Area	Table Chairs	25	24	4.8	600	36	5.1	900	60	5.5	1500
	B Carrels	25	7	1.4	175	9	1.3	225	15	1.4	375
Periodical Area	Table Chairs	25	30	5.9	750	36	5.1	900	60	5.5	1500
	B Carrels	25	7	1.4	175	9	1.3	225	15	1.4	375
Bibliographic Area	Table Chair	25	6	1.2	150	7	1.0	175	12	1.1	300
	Stand Up Table	25	3	.6	75	3	.5	75	8	.8	80

TABLE 36 (Cont'd)

Student Typing Room	Table Chair	25	8	1.6	200	10	1.4	250	16	1.5	400
Newspaper Area	Table Chair	25	5	1.0	125	7	1.0	175	12	1.1	300
Microfilm Readers	Micro. Readers	25	2	.4	50	3	.5	75	5	.5	125
Conference Seminar Rooms (faculty) 15 Stations		20	1	-	300	(-2)	-	(600)	(4)	-	(1200)
Small Group Study (4 station rooms)	Table Chair	25	20	4.0	500	(10) 40	5.7	1000	(20) 80	7.4	2000
Audio Area	C Carrel	25	108	21.4	2700	143	20.4	3575	200	18.6	5000
	D Carrel	25	20	4.0	500	27	3.9	675	35	3.2	875
	E Carrel	-	-	-	-	-	-	-	35	3.2	875
Language Lab	DI Carrel	25	30	5.9	750	30	4.3	750	30	2.8	750
	TOTAL		504	100	13140	700	100	18340	1080	100	28380

All tables and chairs adaptable to A-type carrels as required.

TABLE 37

CARRELS

		Carrel Type	Square Feet Per Station
A	-	Dividers on table tops, for flexibility	25
B	-	Fixed individual carrels	25
C	-	Audio table to accommodate dividers on table top for flexibility	25
D	-	Fixed individual audio carrel or booth, to be adaptable for TV unit	25
D_1	-	Fixed individual tape recorder booth for language laboratory	25
E	-	Audiovisual carrel, fixed individual	25

Small group study rooms - 4 stations with 25 square feet per station.

Conference-seminar rooms - 15 stations with 20 square feet per station.

TABLE 38

DISTRIBUTION OF LIBRARY VOLUMES & PERIODICALS

Enrollment Level FTE Students			I 2800	II 3500	III 6000
	Standard	Total Volumes	41,800(8,360)[1]	49,500(9,900)[1]	77,000(15,400)[1]
Open Stacks	10	Vol	36,550	42,700	61,117
		Sq Ft	3,655	4,270	6,115
Reference (7500 max)	8	Vol	2,500	5,000	7,500
		Sq Ft	300	625	938
Reserve (circulation) (2500 max)	10	Vol	850	1,250	2,500
		Sq Ft	85	125	250
Bibliography (1/2 first phase)	7	Vol	2,000	2,500	2,500
		Sq Ft	286	357	357
Current Periodicals	1	No.	200	300	500
		Sq Ft	200	300	500
Bound Periodicals	8	Vol	500	750	1,250
		Sq Ft	63(189)[2]	74(222)[2]	156(468)[2]
Microfilm Periodicals	15	Reels	800	1,200	2,000
		Sq Ft	50	80	133
Rare Book Vault	7	Vol	-	500	750
		Sq Ft	-	71	107
Newspapers	0.5(1.5)	Vol	6(24)	12(48)	24(96)
		Sq Ft	12(36)	24(72)	48(144)

1. 20% for storage.
2. Tripled for lag in microfilming and/or retention of basic collection.

TABLE 39

PRIMARY LOADS - LIBRARY & AUDIO-VISUAL CENTER

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Head Count	3360	4200	7200
FTE Teachers	115	148	255
LIBRARY			
Volumes	41,800	49,500	77,000
Periodicals			
Current (periodicals)	200	300	500
Bound (volumes)	500	750	1,250
Microfilm reels (readers)	800(2)	1,200(3)	2,000(5)
AUDIO-VISUAL			
Partial Student Use			
Tapes	1,400	1,750	3,000
Records	4,200	5,250	9,000
Primarily Faculty Use			
16 mm film	730	796	1,010
Film Strips	1,500	2,000	2,500
Slides			
Other			
READER STATIONS	(18%)504	(20%)700	(18%) 1,080

TABLE 40

LEARNING RESOURCES CENTER

LIBRARY SPACE FOR CARD CATALOG

Enrollment Level		I	II	III
FTE Students		2800	3500	6000
Volumes	Main	41,800	49,500	77,000
	Reference	2,500	5,000	7,500
Cards[a]	Main	167,200	198,000	308,000
	Reference	10,000	20,000	30,000
Sq. Ft.[b] for Cards	Main	167	198	308
	Reference	10	20	30

TABLE 41

AUDIO-VISUAL STACKS

Volumes	Records	4,200	5,250	9,000
	Tapes	1,400	1,750	3,000
Cards[a]	Records	16,800	21,000	36,000
	Tapes	5,600	7,000	12,000
Sq. Ft.[b] for Cards	Records	17	21	36
	Tapes	6	10	12

[a] 4 Cards per reel, tape, or volume.

[b] Standard OSED 1000 Cards per Square Foot

TABLE 42

PIMA COLLEGE

TAPE AND RECORD STORAGE REQUIREMENTS

Enrollment Level		I	II	III
RECORDS [b]	No.	4,200	5,250	9,000
	Sq. Ft.	40(160)[a]	48(192)[a]	82(328)[a]
TAPES [c]	No.	1400	1750	3000
	Sq. Ft.	16(64)[a]	20(80)[a]	34(136)[a]

a. Multiplied by four to allow for expansion and circulation space.

b. 110 records/square foot

c. 90 tapes/square foot

(b.) College Union Planning Criteria

1. Load Assumptions - Lounges

* 1. Lounges

Level	I	II	
FTE	2800	3500	10% of enrollment, normal, checked against total seats in food areas subtracted from seats required for total peak seating. @ 15 sq. ft./seat.

Level	III	
FTE	6000	Add 5% of increase; checked against peak needs as above. @ 15 sq. ft./seat.

1a. Storage	Distributed @ 10% of the area(s) served. Overall total less than 10% creates use problems for public areas.
3. Faculty-Student Alcove (within Lounge(1)	Space for 15 person nucleus. @ 15 sq. ft./seat.
6. Faculty-Staff Lounge	Adjoins meeting room to permit expansion for special occasions.

FTE	2800	3500	6000
NO. FACULTY @ 25-1	112	152	292
NO. SEATS @ 8%	15	15	25

7. Quiet-Cot Room	PHASE	I	II	III
(300 men, 300 women)		-	600	600

* Numbers refer to corresponding numbers in Table 29, College Union.

8.	Music Listening & Recreational Reading "Bridge" & nucleus to Library for those not enrolled in Fine Arts, etc.	Experience: Must adjoin Information Desk and Main Lounge; Experience: Small area for recreational reading recommended to serve as some study and reading area in combination with music listening, both areas serve to handle peaks for each other.
10.	Display Cases	Experience.

2. Load Assumptions - Food Services & Related Joinable Seating Space

1. Total individuals is FTE. ÷ 80%

2. Peak of students on campus over the 11:50 to 1 PM period is determined to be 90% of the total individuals, from other Junior College experience and based upon a relatively even distribution of classes over the day. (Common in College Unions for daily traffic counts to vary from 100% to 200% of the total enrollment.)

3. Number of seats balances approximately with overall seating required for peak on campus.

4. Peak load is 90%.

Food Service Loads:

Peak Load: 90% of head count at peak;
distributed over campus facilities:

PHASE I & PHASE II	PHASE III
10% in Divisions	20% in Divisions
50% go off campus	30% go off campus
40% at Union	50% at Union
100%	100%

PHASE I & II (cont.)

NOTE: This proportion developed to meet close budget; adjoining facilities marked (*) in plan relationships will enable additional seating of peaks to care for approximately 10% more if absolutely necessary.

Additional facilities can be added any time by means of one or two "Satellite" Unions to accomodate an additional 20%, thus,bringing those going off campus to 30%, a more proper level of service to the campus community.

PHASE III (cont.)

NOTE: With the more appropriate level of service at 70% on campus & 30% off campus the 20% additional is cared for by:

1. Increasing Divisions by 10% and increasing
2. the Central Union by 10%; or
3. 2 Satellites of 10% each can be added. If the latter is more desirable, it can be determined, based on experience figures for the first 3 years.

3. Load Assumptions - College Union

*18.	Vending Alcoves	In 500 square foot units; experience.
19.	Kitchen	Experience.
31. -33.	Staff Lounge and Lockers	Experience.
34. -43.	Headquarters for Student Activities	Experience; office standards and statistics
49. -54.	Student Personnel & Health Services	Experience; statistics and standards.
55. -60.	Information and Service Areas	Experience and statistics.
61.	Bookstore: sq. footage @	2½ per student for 2800 FTE 2½ per student for 3500 FTE 2 per student for 6000 FTE

* Numbers refer to corresponding numbers in Table 29, College Union.

3. Load Assumptions - College Union (cont'd)

68.	Billiards	1970	6 - Based on 1 per 750 students (ACU* statistics) and @ 300 sq. ft. per table.
		1975	10 - Based on 1 per 750 students (ACU* statistics) and @ 300 sq. ft. per table.
69.	Table Tennis		Experience; use mobile tables for easy storage for other multi-use of this space.
70.	Table Games & Lounge		Experience.
71.	Games Control Desk		Experience.
72.	Games Manager's Office and Storage		Experience and standards.
73.	TV Room		Experience.
74.	Lockers - in Central Union		Experience. Full length - @ 1½ sq. ft. per locker.
	- in Divisions		1 box locker for 50% of the division's enrollment, @ 2 lockers per unit, each unit requiring 1½ sq. ft. (1 sq. ft. = No. in Division X .50% X $\frac{1.5}{2}$)
75.	Outdoor Sports Headquarters		Experience.
76.	Patios		Experience.

TABLE 43

FOOD SERVICES AND RELATED JOINABLE SEATING SPACES

Enrollment Level	I	II	III	
FTE Students	2800	3500	6000	
Individuals	3360	4375	7500	FTE ÷ 80%
Peak Seats Overall	3024	3938	6750	Individuals x 90%
Peak Seats for 6 Divisions	320-10%, 2-½T, 10 sq.ft.per seat	350	560	Turnover (2½T-11 a.m.-1 p.m. peak x 2/5)
Peak Seats Individual	1210	1575	2700	40% of Peak Overall
Peak Service Seats Required in Union	484	630	1080	40% of Peak Individual; @ 2½ T; @ 15 sq. ft./seat
Lounge(for information)	280	350	475	
Snack Bar-Cafeteria	350	480	610	
Multipurpose	166	350	385	Group Activity tends to stabilize
Dining-Meeting-Banquet	150	200	200	Group Activity tends to stabilize
Special Atmosphere Dining	40	60	60	

TABLE 43 (cont.)

Faculty Dining	(20)	(40)	(60)
Subtotal	706	1090	1255
Total with Lounge	986	1440	1730
	986 with lounge for 1210 people at Union -166 in Multipurpose 820 in Union +320 in Divisions (6) 1140 Seats total for 3024	1440 with lounge for 1575 people at Union -350 in Multipurpose 1090 in Union +350 in Divisions (6) 1440 Seats total for 3938	1730 with lounge for 2700 people at Union -385 in Multipurpose 1345 in Union 200 increase in Divisions +360 in Divisions (6) 1905 Seats total for 6750
	and a 350 seat facility for special events, exhibits, movies, conferences, luncheons, visiting groups, etc.; cares for additional factor of those who come for noon meals before later p.m. classes.	seats or 1575 seats and a 350 seat facility for special events, exhibits, movies, conferences, luncheons, visiting groups, etc.; cares for additional factor of those who come for noon meals before later p.m. classes.	or 2700 seats and a 350 seat facility for special events, exhibits, movies, conferences, luncheons, visiting groups, etc.; cares for additional factor of those who come for noon meals before later p. m. classes.

(c.) Physical Education Facilities Planning Criteria

I. Peak load was determined by the following assumptions:

  a. There are an average of 2.1 contact hours/head count student taking P.E. The 0.1 allows for physical education majors and student assistants.

  b. The average class size in physical education is 30. Maximum class size is 40.

  c. The total peak load for physical education classes at any one time is 15 classes.

  d. Intramural sports will be accommodated in the visiting team locker and shower rooms.

  e. There will be a separate varsity locker and shower room.

  f. The differential between the calculation of head count students, from contact hours, and the total head count for the design level assumes that approximately 10% of the students will not be required to take P.E. for reasons of age, veteran status or medical excuse in enrollment level one and 20% in enrollment levels two and three.

  g. P.E. instruction will be given a minimum of 9 hours per day.

  h. One storage locker per FTE student.

TABLE 44

LOADS - PHYSICAL EDUCATION

Enrollment Level	I	II	III
FTE Students	2800	3500	6000
Head Count Students	3360	4200	7200
Lab Contact Hours Physical Education	7056	7938	11,676
Head Count Students	3024	3780	5560
Number of Classes per Week	101	126	185
Number of Classes per Day	20	25	37
Number of Classes per Hour	2	3	4
Peak (1/3 day average)	200	250	370
Number of Physical Education Classroom Stations Demanded	53	63	103
Number 45 Station Classrooms	1	2	3

TABLE 45 : STUDENT LOAD ASSUMPTIONS - GYMNASIUM

	Enrollment Level			I					II					III		
	FTE Students			2800					3500					6000		
	Total Peak Load			200					250					370		
				No.	Sq.Ft.				No.	Sq.Ft.				No.	Sq.Ft.	
Men 60%	Storage Locker			1680	2520				2100	3150				3600	5400	
	Dressing Locker 1/9			165	495				233	699				400	1200	
	Shower *			30	600				38	760				55	1100	
	Toilet Facilities *	120	U	8	160	420	150	U	10	200	512	222	U	15	300	768
			W	5	135			W	6	162			W	9	243	
			L	5	125			L	6	150			L	9	225	
	Toweling			30	450				38	570				55	825	
Women 40%	Storage Locker			1120	1680				1400	2100				2400	3600	
	Dressing Locker 1/9	129		103	309	387	155		124	372	1054	267		214	642	1808
	Private Dr.Cubicle(20%)			26	572				31	682				53	1166	
	Gang Shower (80%) *	80		22	440	550	100		27	540	694	148		39	780	1000
	Cubicle Shower (20%) *			5	110				7	154				10	220	
	Toilet Facilities *	80	W	3	81	-	100	W	4	108	208	148	W	6	162	312
			L	3	75			L	4	100			L	6	150	
	Toweling *			20	300				25	375				37	555	
	Hair Drying *			16	448				20	560				30	840	
	Powder Room *			16	400				20	500				30	750	

* Phase II net assignable square footage used for Phase I facilities.

TABLE 46

FACULTY LOAD ASSUMPTIONS - GYMNASIUM

	Enrollment Level	I		II		III	
	FTE Faculty	113		145		251	
	FTE Physical Education Faculty	9		11		17	
		No.	Sq. Ft.	No.	Sq. Ft.	No.	Sq. Ft.
Men 70%	Storage Lockers	30(15)	90	30(15)	90	53(27)	159
	Dressing Lockers	11	33	11	33	27	81
	Gang Showers	4	80	4	80	7	140
Women 30%	Storage Lockers	13(7)	39	13(7)	39	22(11)	66
	Dressing Cubicles and Lockers	6	132	6	132	11	242
	Cubicle Showers	2	44	2	44	4	88

1. ( ) = Peak Load. Faculty peak load = 50% of faculty assumed to be using physical education facilities.
2. Faculty locker room to accommodate storage lockers for 30% of the faculty - Physical Education instructors.
3. Faculty locker room to accommodate dressing lockers for 1/6 of the peak load.
4. Permanent dressing lockers are provided for each of the physical education faculty.

TABLE 47

TEAM LOCKER ROOM ASSUMPTIONS

	Stations		Square Feet
Team Lockers	44		440
Toweling Area	11		165
Gang Showers	11		220
Toilet	U 6	120	
	W 4	108	
	L 4	100	
Total			1153

TABLE 48

FIXTURE RATIOS FOR PEAK LOAD - TOILET FACILITIES

Urinals	1/15/ students	
Water Closets	Male	1/25 students
	Female	1/25 students
Lavatories	1/25 students	
Showers	Male	1/4 students
	Female	1/3 students
Toweling Room	1 station for each 4 students of peak	
Women's Hair Drying	1 dryer for each 5 females in peak	

TABLE 49

PHYSICAL EDUCATION FACILITIES

ATHLETIC FACILITY SPACE STANDARDS

1.	Storage Lockers (Box)	1.5 Sq.Ft./Station	(incl circulation)
2.	Dressing Lockers 9-1 ratio	3 Sq.Ft./Station	(incl circulation)
3.	Team Room Lockers	10 Sq.Ft./Station	(incl circulation)
4.	Female Faculty Locker/Dressing	22 Sq.Ft./Station	
5.	Faculty Lockers	3 Sq.Ft./Station	
6.	Dressing Cubicle	22 Sq.Ft./Station	(incl circulation)
7.	Gang Shower	20 Sq.Ft./Station	(incl circulation)
8.	Individual Shower	22 Sq.Ft./Station	(incl circulation)
9.	Urinal	20 Sq.Ft./Station	
10.	Water Closet	27 Sq.Ft./Station	
11.	Lavatory	25 Sq.Ft./Station	
12.	Hair Drying Area	28 Sq.Ft./Station	
13.	Toweling Area	15 Sq.Ft./Station	
14.	Powder Room	25 Sq.Ft./Station	
15.	Gymnasium Bleachers	2.5 Sq.Ft./Station	
16.	Removable Bleachers	3 Sq.Ft./Station	
17.	Permanent Stadium Bleachers	4 Sq.Ft./Station	
18.	Olympic Pool Bleachers	4 Sq.Ft./Station	
19.	Entrance and Foyer	.75 Sq.Ft./Station	

TABLE 50

PIMA COLLEGE

SPACE STANDARDS

ADMINISTRATIVE, ACTIVITY, SERVICE & FACULTY OFFICES & RELATED SERVICE

ROOM TYPE	SQ.FT/STA	SQ.FT.
President		400
Secretary-Reception	Sec - 85(2) Rec - 20(8)	330
Vice President		300
Secretary-Reception	Sec - 85(2) Rec - 20(4)	250
Files & Storage	20% of office & Sec - Rec	
Director		180
Secretary-Reception	Sec - 85(1) Rec - 20(3)	145
Files & Storage	20% of office and Sec - Rec	
Division Head or Dean	-	150
Department Head or Supervisor	-	120
Secretary	-	85
Clerical Staff Member	-	85
Advisor or Staff	-	100
Counselor	-	120
Faculty	-	80
Art & Music Instr. Faculty	-	160
Conference Room	20	-
Seminar - Language & Conference	24	- -
Board Table	20	-
Press & Staff	15	-
Public Seating	12	-

TABLE 51

PIMA COLLEGE

SPACE STANDARDS

INSTRUCTIONAL SPACE CLASSROOM & SEMINAR

ROOM TYPE	STA/ROOM	SQ.FT/STA	SQ.FT.
Individual Study Carrel	1	25	25
Classroom [a]	15	24	360
Seminar[b]	20	20	400
Classroom	30	19	570
Classroom[b]	35	17	595
Classroom[b]	45	16	720
Classroom[b]	50	15	750
Classroom[b]	60	14	840
Classroom[b]	75	13	975
Lecture/Demo. Science Classroom [c]	100	15	1500
Lecture/Demo. Classroom [d]	125	11	1375
Lecture/Demo. Classroom [d]	200	9	1800
Lecture/Demo. Classroom[d]	300	9	2700
Physical Science Laboratories	24 & 30	50	1200 & 1500
Life Science Laboratories	30 & 24	50	1500 & 1200
Other Laboratories, special classrooms & service spaces	(Varies - see facility program.)		

a. Conference table & chairs

b. Movable table-arm chairs

c. Science-continuous counter & chair

d. Fixed seats w/drop table arm chairs

TABLE 52

COMPARATIVE SPACE STANDARDS FOR LABORATORIES

Laboratory Type	Standards California Public Segments	1963 Variations of California Junior Colleges	Guide for Planning Community Colleges
	Square Feet Per Station	Square Feet Per Station	Square Feet Per Station
Biological Science	55	26 - 60	50
Physical Sciences	60	23 - 60	50
Business	30	-	30 - 50
Applied Graphic Arts	80	22 - 139	50
Health Sciences	50	21 - 72	50
Aeronautical Technology	175	76 - 210	-
Electronic Technology	60	32 - 126	50
Welding	90	67 - 125	150
Personal and Public Services	50	-	-
Home Economics	60	24 - 94	60
Drafting Technology	60	28 - 82	50

APPENDIX A

PERSONS ATTENDING HEALTH SERVICES MEETING

Dr. Wilfred Alter	Southern Arizona Dental Society
Mrs. Mary Lou Bower	St. Mary's Hospital
Mr. Fred Emery	Thomas-Davis
Dr. Thomas J. Kesson	Pima County Osteopathic Society
Mrs. S. Carrie Larsen	Arizona Federation of LPN's
Dr. Jack Levkowitz	Southern Arizona Dental Society
Mrs. Nell Pace	St. Mary's Hospital, Assistant Director of Nursing
Mr. Richard Snider	Program Coordinator, Pima County Junior College
Dr. Gladys Sorenson	Arizona State Nurses Association
Mr. Paul Walker	Program Coordinator, Pima County Junior College

PERSONS ATTENDING ELECTRICAL AND ELECTRONICS TECHNOLOGY MEETING

Mr. Joe Crystall	KOLD
Mr. Bill Janssen	Data Processing (URS)
Mr. Henry Koerner	Burr-Brown
Mr. Lee Martin	Westinghouse Repair
Mr. E. L. Morrison	Bell Aerosystems
Mr. Phil Richardson	KTKT
Mr. Frank Sliva	T.G. & E.

PERSONS ATTENDING AUTOMOTIVE TECHNOLOGY MEETING

Mr. Harold Adamson	Baum & Adamson's
Mr. Bill Blodgett	Paulin Motors
Mr. Bob Goodrich	Quebedeaux Pontiac
Mr. E. A. Zimmerman	Zimmerman Buick

PERSONS ATTENDING LAW ENFORCEMENT, FIRE PREVENTION, AND SECURITY TECHNOLOGIES MEETING

Mr. K. F. Dirks	City of Tucson Fire Department
Mr. Clyde W. Doran	U. S. Forest Service
Mr. James P. Kelly	U. S. Border Patrol
Lt. Francis R. Kessler	City of Tucson Police Department
Mr. M. L. Richardson	Arizona Highway Patrol
Capt. Richard Williams	Pima County Sheriff's Office
Mr. Tony Zinkus	Alert Security Patrol

PERSONS ATTENDING PERSONNEL DIRECTORS MEETING

Mrs. Patricia Bower	St. Joseph's Hospital
Mr. John Butler	Arizona State Employment Service
Miss Nannette L. Cordt	Kelly Girl Services
Mrs. Elizabeth Erwin	Placement Office, University of Arizona
Mr. Larry Gammon	Gammon Placement Service
Mr. Jack Garrett	Far Western Placement Office
Mr. Larry Graham	Davis-Monthan Civilian Personnel Dept.
Mr. Paul Miner	City Personnel Director
Mr. Bill Ricker	RCA
Mr. R. K. Sheldon	Chief Personnel Office, U.S.P.O.
Mr. Art Villaescusa	Davis-Monthan Civilian Personnel Dept.
Mrs. Earline Waldon	Davis-Monthan Civilian Personnel Dept.

PERSONS ATTENDING HOTEL, MOTEL, AND FOOD SERVICE PROGRAMS MEETING

Mr. Al Kaurman	Owner-Operator, Bistro Restaurant
Mr. Robert Minnerick	Part Owner-Operator, Pioneer Hotel
Mr. Bernard W. Robbins	Owner-Operator, Hiway House Hotel
Mr. Jack Sarver	Owner-Operator, Desert Inn and Aztec Inn
Mr. S. L. Schorr	Attorney, Member Junior College Board

PERSONS ATTENDING AIR CONDITIONING AND REFRIGERATION MEETING

Dr. Thomas Lee	Assistant Superintendent, Tucson School District #1
Mr. Charles Lotti	Don Means Air Conditioning
Mr. Paul N. Walker	Program Coordinator, Pima County Junior College
Mr. Tom Walker	Representing F. F. Walker, Mechanical Contractor

PERSONS ATTENDING DISCUSSION OF THE SOUTHERN ARIZONA LEAGUE FOR NURSING

Dr. Thomas E. Bradel	M.D.
Dr. Lloyd Epstein	M.D.
Mr. Jacob Fruchthendler	Moderator
Miss Jane Furness, R.N.	College of Nursing, University of Arizoma
Sister Elizabeth Joseph	Administrative Division of Nursing, St. Joseph's Hospital
Mrs. Beatrice Mason	Director of Nursing Service, Tucson Medical Center
Dr. Roland Thorpe	M.D.

PERSONS ATTENDING AVIATION MEETING

Mr. Charles H. Broman	Tucson Airport Authority
Mr. Dean Brown	Continental Airlines
Mr. Hector E. Martinez	Aeroport de Mexico
Mr. Stanley P. Phillips	TWA Airlines
Dr. Murray F. Skinner	Vice President, Hamilton Aircraft
Mr. J. B. Wilcox	Educational Advisory Committee

PERSONS ATTENDING AGRICULTURE MEETING

Mr. James F. Armstrong	Agricultural Extension Service
Mr. Dirk Broekema	Union Bank
Mr. Dan Clark	Southern Arizona Bank
Mr. Tom Clark	Pima County Farm Bureau
Mr. Warren Culbertson	Farmer's Investment Company
Mr. Floyd M. Edwards	Blue Cross Blue Shield
Mr. Paul Hasking	Edward O. Earl Construction
Mr. Bill Hendrix	Amphitheater Schools
Mr. Carlos Moore	Arizona State Superintendent of Agricultural Education
Mr. Al Oshrin	Oshrin Hospital
Mr. Gilbert Ronstadt	F. Ronstadt Hardware
Mr. Maurice E. Speer	Erly Fat Livestock Feed
Mr. Harry Timmons	Producers Cotton Oil Company
Mr. Lyle Young	First National Bank

PERSONS ATTENDING OPTICS MEETING

Dr. George Howard	Dean, College of Engineering, University of Arizona
Mr. Mario Sivilli	Sivilli Instrument Company
Mr. Frank Weiss	Wuerschmidt's Optical

APPENDIX B

This section on computers and community colleges is appended to satisfy an inquiry of the Pima County Community College Board of Governors. It is designed for the information of those who are interested.

COMPUTERS AND COMMUNITY COLLEGES

Condensed from a paper by Mr. Robert Gordon, Assistant Director of Computer Facilities, University of California at Irvine

The uses of computers in a community college fall mainly into three categories. In the first class are the activities which use the computer in college administration; in the second class are the activities called computer-assisted learning; the third class consists of activities related to the college curriculum. A fourth type of use, the "traditional" one of the four year colleges and universities, is called research computing. There appears to be so little use of research computing in community colleges that it will be ignored in the sequel.

Computers and Administration

There is hardly any aspect of college administration now untouched by the computer and its associated technologies. Applications of the computer include what is often called routine data processing (payroll, receivables and payables, inventory), as well as the non-routine (classroom scheduling, test scoring, physical planning). The extent of the use of computers in these ways is a matter both of taste and of the willingness of trustees to make funds available for these purposes.

Often, the use of administrative data processing has developed because a computer was available in the classroom. Usually, the faculty has been instrumental in promoting its use for administrative purposes. The faculty role has been both educational and activistic. Until recently, however, the type of equipment available precluded extensive joint use by classes and administration because of the equipment's relatively limited capacity and the high demand for class use. The acquisition of a computer and staff primarily for administrative purposes is often hindered by the apparently high costs involved. In some cases, therefore, the sharing of such equipment among several administrative groups, as in California's regional Schools Data Centers, is an attractive alternative to sole "ownership" of a computing system. For smaller schools joint ownership may be the only alternative.

Whatever the financial circumstances, a new community college need not begin from "scratch" its use of a computer for administrative purposes. Many computer programs are available to an audience vastly greater than that for which a program may have been developed; all one need do is ask. Valuable information may be obtained from the vendor or prospective vendor of the equipment sought. Another source is the person or organization responsible for the development of the desired program. He can be identified from his articles and papers in trade or technical publications, as well as from the proceedings of technical conferences dealing with the subjects in question. Two sources of information are the following:

Association for Educational Data Systems
1201 16th, Northwest
Washington, D. C. 20036

Society for the Automation in Business Education
California State College at San Diego
San Diego, California

One difficulty with computers is finding and retaining qualified, experienced personnel, as the demand for such people far exceeds the supply. The college does enjoy an advantage over its prospective competition for staff because it can recruit top junior personnel from the students in its computing curriculum.

The future trend is toward what is called the multiple-access computing system. In this system several users have access to the computer simultaneously (a result of the disparity between the speed of the computer and the speed of a human being in providing "input" for the computer.) The use of the multiple-access computing system should change the performance of the conventional data processing mentioned above and open up the area called library administration (acquisitions accounting, cataloging and circulation control).

The use of the computer in the community college library will probably not for a decade extend to information storage or retrieval and dissemination systems. However, the "automated library catalog" will be in widespread use in less than ten years and will likely be integrated with the circulation-control system.

Computer-Assisted Learning

The computer as a mechanism for presenting instructional materials to students is in its infancy today, but again, through the multiple-access computing system, it promises to have a pervasive influence on educational activity. It is too early to detail this influence, but the intensity and extent of government (Office of Education), industrial (IBM, General Learning Corporation, Raytheon, RCA, Xerox), and of university activity (University of California, Irvine, Stanford, Pennsylvania State, Illinois) are augurs of the future. Administration, faculty and trustees should alert themselves to the ways in which 20th century technology can benefit education (Two examples of academic response to technological innovation can be seen at Oakland Community College and Grand Valley State College.)

Investigations in the area of computer-assisted learning have disclosed the ability of the computer to present appropriately devised sequences of verbal symbols to students, and to do it with the following advantages:

1. The material can be organized for highly individualized instruction. Not only can each student proceed at his own pace (the multiple-access computing system makes it possible for many students to use the same computer and the same instructional materials simultaneously), but because appropriate testing is an intrinsic part of the programmed presentation, he need cover only such material as the testing discloses to be required.

2. The progress of the student through each instructional sequence may be monitored in detail, if desired.

3. The computer-as-instructor is infinitely patient, gentle and never given to anger over the behavior of the slow or dull-witted student. Students quickly notice these attributes and reflect their appreciation of it through their performance.

4. The computer may be used as both an instructional and a computing device in the same course. In a statistics class, for example, after the student has learned the rules for inferring the mean of a population from the statistics of a sample, he can be assigned problems requiring the use of the computer as a calculator.

5. The use of the computer gives human instructors more time for those things which only human instructors can do. The computer is a good "teacher" for many kinds of drill-and-practice materials. The human teacher is thereby freed from many routine teaching tasks and can devote his time to problems.

6. There is reason to believe the unit cost of instruction--dollars per student per learning unit--will be lower in the computer-assisted learning environment a decade from now than it will be where only human instructors are used.

Experiment and practice to date have shown that the computer can be used for drill-and-practice in the tutorial mode and in dialogue (i.e., the student asks questions as well as answers them). In addition, non-verbal symbols can be communicated in both still and motion formats. The promise of computer-assisted learning seems limited only by man's imagination.

Computers and the Curriculum

Programs or classes in computing and data processing are being offered in the community colleges for three basic purposes: orientation, technician training and management training. The demand for qualified, trained personnel is likely to increase the pressures for curricula satisfying these stated purposes.

The orientation programs are designed to provide students with a broad understanding of the nature of the computer and its many associated technologies and their roles in our society. Introductory survey courses are concerned with the common principles of the machines that manipulate data for commerce, industry, science, engineering, government, and education. Furthermore, introductory survey courses teach the uses of computers in each of the fields along with terminology, an understanding of data systems and procedures, and a feeling for the social implications of computer use.

The technician training program is intended to prepare students for employment in computing or data processing installations. The student is instructed in the applications, operation, and programming of the equipment that is used to process data for commerce, industry, science, engineering, government and education. In addition, he is usually required to take related work in such fields as mathematics, accounting, communication skills (both written and oral) and business management to insure that he is trained for more than mere manipulative skills.

The classes offered in computing and data processing for management training complement the basic undergraduate work taken in established areas of concentration such as accounting and production. These classes introduce the computer as a mechanism for providing management with information. They provide the student with knowledge of both programming (by requiring some of the same courses the technician training program provides) and of the uses for the computer in his particular field.

APPENDIX C

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